

REPORT

OF THE

DEPARTMENT OF AGRICULTURE

1957



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REPORT OF THE DEPARTMENT OF AGRICULTURE FOR THE YEAR 1957

PART I—POLICY AND GENERAL SUMMARY

The approved seven-point Agricultural Policy was detailed in last year's report; in short it can be expressed:—

“to ensure the best land use, by conserving the productivity and fertility of the soil and to encourage a balanced production of food and cash crops and livestock, with surpluses for export, to the best advantage of the community”.

2. Such a generalised policy is common to every agricultural country and is one which can readily be accepted by all, irrespective of their political views. Of greater importance in fact is the degree of effectiveness attained in the implementation of this policy; it is not necessarily lightly achieved, and funds and staff must essentially be provided both for direct assistance to be given to the farming community through extension services and for research and experimentation. The latter alone can prove and demonstrate the more successful and lucrative techniques which the farmers can thereafter put into practice for themselves.

3. In general, major changes in policy are comparatively rare, whereas minor ones occur more frequently; they can result from changes in the emphasis which is placed on particular crop developments, from fluctuations in the outside world market conditions, or from the influence of internal economic factors, such as those which Sierra Leone has been experiencing over the last few years because of the diamond “rush”.

4. For a number of years particular attention has been given to increased rice production, and the mechanised rice cultivation scheme has been built up until 12,000 acres are now being ploughed annually on contract by the Department with a further 3,000 acres by Co-operatives. Further expansion will now follow the approved pattern whereby the Co-operatives take over a gradually increasing acreage as Producer Societies become established, and this Department will continue to open up further new and equivalent acreages to maintain its 12,000 acre target.

5. Yet despite increased production from the mechanisation scheme, and from the Scarcies,—the main rice growing area of the territory,—there has been an alarmingly increased import of rice in the years 1954—57. This has largely been occasioned by the attraction of many strangers and of many younger farmers to the diamond workings, and by the increasing levels of consumption. Previously, as is illustrated in Appendix V, Sierra Leone on balance, was able to maintain approximate self-sufficiency in rice, except in very unfavourable seasons.

6. However, as the year ends with many of the strangers returning to their own country, and some of the farmers to their homes, it is anticipated that 1958 should show some reduction in imports. Nonetheless it is a sobering thought that the extra local production required to offset the import of 36,700 tons in 1956 would mean the equivalent of a further 75,000 acres under mechanical cultivation.

7. Whilst rice is the main staple food, Sierra Leone has always been an exporter of a variety of other crops, and although, by comparison with Ghana and Nigeria, its production, because of its size, has been necessarily more limited, this has been reasonably well diversified.

8. The value of agricultural exports has in fact accounted in the past for 70 per cent of the total exports (1951), but they have now declined in quantity and in 1957 the value is only 27 per cent. In part this is due to less favourable world prices, and to increasing values of mineral exports, particularly iron ore and diamonds, but it is also primarily because of the shrinking export of palm kernels, which have fallen from 75,000 tons (1949-52) to 53,000 tons in 1957. This is illustrated diagrammatically in Appendix VI.

9. Yet Sierra Leone is primarily an agricultural country and although in the years ahead it may well develop a greater degree of local industrialisation, it must for a long time to come rely on agriculture as the main-stay of its economy. It should, to this end therefore, encourage and develop its natural resources in reasoned proportion, however tempting the distractions of other enterprises may seem to be.

10. This principle has been fully elaborated in the White Paper which has recently been in preparation for the Ministry; this paper combines a review of local agriculture and its importance to the Country's economy with an evaluation of the progress achieved since the Economic Plan was published in 1949, and concludes with recommendations and proposals for further developments over the next five years.

11. The review indicates that whilst the individual export crop targets set in the Economic Plan have, on occasions, been achieved for most crops, except palm kernels, over the last eight years, only cocoa, coffee and piassava have been steadily increasing or have surpassed the target consistently. Ginger, for instance, which did very well in 1950 and 1951, has subsequently had a severe set back and at the present time, because there is little or no worthwhile world market demand, there is virtually no export.

12. The alarming decline in palm kernel exports, which can well have serious repercussions on the economy in the future if it is not reversed, has already been mentioned. This has been occasioned because the younger men who harvested the fruit have been absent in the diamond areas, and because the majority of farmers have yet to regard oil palms as a crop. They exploit wild palms only if there is no other way of supplementing the family budget and as a result efforts to distribute better high yielding types have met with very disappointing results.

13. At the same time although the Produce Marketing Board has continued to offer a stable and subsidised price for kernels, and to operate some of the Pioneer oil mills at a loss, there has been an equally disappointing response.

14. A change of policy has therefore been proposed, and a programme for the establishment of plantations in conjunction with the pioneer oil mills is now under consideration.

15. Coffee production, favourably affected by world prices, has continued to expand, and once again exports have attained a record of 3,758 tons. Cocoa purchases, in spite of less favourable weather conditions and consequent lower yields, have also been maintained through new areas coming into production. Both these crops, are likely to continue to expand over the next few years, although cocoa is far the less popular of the two; yet in view of the increasing world production of coffee, caution against over expansion of this crop is advisable.

16. The Department's preliminary spraying trials against Black Pod disease indicate that this treatment may well be economically worthwhile in certain areas; control of black pod, and capsid, together with the effective protection of farms against damage by monkeys and goats could between them result in a doubling of cocoa production without any increase in acreage.

17. Plans are therefore in hand to extend these trials, and thereafter it is hoped that farmers can be encouraged to spray for themselves, once the techniques have been proven. The Cocoa Co-operative Societies could then play a useful part by helping to provide the necessary equipment and materials.

18. The development of rubber as a crop in Sierra Leone has been neglected in the past. There would seem to be no reason why it should not do well here provided good quality production can be achieved at reasonable and competitive cost. It is primarily, however, a crop best suited to plantation production, with small farmer enterprise developing thereafter around a central factory unit, and benefitting therefrom. It is intended, as a start, to test high yielding types, so that the necessary production data can be acquired.

19. All in all, in 1957, whilst, many farmers have been able to earn a worthwhile income from rice, coffee and cocoa production in particular, others, in areas where these crops cannot be grown, have been less fortunate. The exploitation of the wild oil palms and the proper utilisation of higher yielding strains have been seriously neglected. All farmers are vulnerable to a fall in world market prices, and it is also significant that local rice production is being subsidised very considerably.

20. It is vital therefore that future agricultural planning should be diversified and production should reach maximum yields and efficiency, with the attainment of the most superior qualities possible for export commodities. There must be a greater agricultural consciousness developed amongst the whole community, and a balanced appreciation that modern production methods, which can lead to the attainment of these *desiderata*, also imply changes in the concept, amongst other things, of the existing patterns of land tenure.

A—THE PROVISION OF ADEQUATE FOOD FOR THE POPULATION

21. *Rice*.—This being the staple food of the country, continued to receive special attention. The upland crop was a reasonably good one with the trend continuing towards a decreasing acreage, partly because of the greater use of swamps and bolis but also due to the movement of farmers away to the diamond diggings. The overall output from the uplands therefore, was probably lower, because of the smaller acreage grown. Inland swamp production showed some expansion with reasonable yields; and in the Scarcies, from the tidal mangrove swamps, the crop was excellent, being probably one of the highest on record. There was a considerable rice surplus from this area and storage facilities were severely taxed. In the southern riverain grasslands, flooding was generally below normal with the result that low lying areas gave better yields, whilst on the higher banks they were below average. In general however this crop was also very fair and, with increased areas of mechanised cultivation, there have been considerable local surpluses, here again buying, transport and storage facilities were overtaxed.

22. Yet despite this general pattern of satisfactory yields, it was still necessary to import 31,000 tons of rice for the reasons which have already been stated in the introduction to this report.

23. The policy of encouraging the movement of rice farming from the more easily eroded and less fertile uplands, which is also uneconomic in labour, to the fertile and more economically cultivated swamps, continues. Assistance schemes, started some years ago to facilitate the greater use of mangrove and other swamp areas, were pressed both departmentally and through District Councils; but, although there is a considerable and increasing annual movement towards inland swamp farming, particularly in the north; interest in mangrove swamps, except in the Scarcies, has waned in recent years and no great extension has resulted. This is largely due to the movement of younger men away to diamond mining and to work in the towns. Some of the successful empolder schemes have suffered recently because the District Councils, to whom they were handed over, have had inadequate staff and funds to run them properly; consideration is therefore being given to their reverting back to the Central Government. However, those at Maswari and Wellington in the Colony Area are functioning more successfully; and other smaller schemes, in which the follow up has been left to the farmers own initiative, continue to be encouraged by departmental staff.

24. For the Mechanical Cultivation Scheme, described in detail in previous reports, this was the first year of the new policy of limiting the departmental acreage to a maximum of 12,000 acres with the additional hand over of certain established sites to Rice Producer Co-operatives, which they cultivated for themselves. This transfer was carried out smoothly on sites at Torma, Massimo and Gbundapi. At Massimo the departmental compound, rest house, stores and workshops buildings were also handed over for the use of the Co-operative Department's Mechanical Superintendent. The Co-operatives purchased 22 Ferguson wheeled tractors and equipment for their work; such tractors being suitable for operations on the drier sites once the initial heavy establishment work has been completed. The Co-operative Department also started the erection of new quarters at Torma. One Agricultural Superintendent was loaned to that Department to help supervise the first season's work at Massimo.

25. The total area cultivated was 12,027 acres departmentally and 3,340 acres by Co-operatives. The acreage progressively cultivated by the Department since the start of this scheme is as follows:—

<i>District</i>	<i>Acres Ploughed</i>								
	1949	1950	1951	1952	1953	1954	1955	1956	1957
Southern Circle ..	4	69	282	465	1,178	2,278	4,073	5,530	5,302
North-western Circle	—	—	80	645	683	757	1,014	2,008	2,334
South-western Circle	—	—	32	719	1,018	1,012	1,173	1,484	1,606
Northern Circle ..	—	—	—	238	915	2,449	3,600	2,819	2,625
North-eastern Circle	—	—	—	30	163	127	141	250	160
Colony	—	—	—	—	—	4	65		
Total ..	4	69	394	2,097	3,957	66,27	10,066	12,091	12,027

26. A new problem, which has arisen to Government, through the expansion of this scheme, is that of the organisation of rice buying and the provision of adequate storage and transport facilities, which are handled by the Director of Commerce and Industry. In the Bonthe Area particularly where communications are more difficult, this became acute.

27. It is becoming more and more obvious, that to be practicable and economic, mechanical work must be concentrated into blocks with equipment of a unit size, suitable for the maintenance supervision of one Mechanical Superintendent. Scattered sites have added complications of transport and general communications which inevitably lead to a waste of time and expense over repair work and general administration. In view of this, several small sites were abandoned and the acreage made up by expansion of larger sites. Whilst this is naturally disappointing to some farmers who now have to travel farther to their new farms it increases the efficiency of the scheme as a whole.

28. The distribution of fertilisers, particularly superphosphate for the bolis, continued and some 132 tons were sold; this was rather less than in the previous year partly because of transport difficulties. The Government again subsidised the c.i.f. price by two thirds, a policy which was introduced four years ago.

29. The West African Rice Research Station at Rokupr is also making a very important contribution towards increasing production through the selection, testing and distribution of new varieties of rice seed and by the investigation of problems of mangrove soil utilisation. This station publishes a separate report in which the results of its work are detailed.

30. *Other Food Crops.*—Vegetable production continues to expand, more particularly in the Colony area but also increasingly around provincial centres; market gardeners have been encouraged and assisted by the Horticultural staff and with supplies of seeds, seedlings and fertilisers. Cassava, the second most important food crop, is grown on a large scale and yields were good. The groundnut crop was above average but was all consumed locally. Sweet potatoes are grown in most gardens and this production is increasing steadily.

31. *Livestock Cattle.*—At the Animal Husbandry Station at Musaia the long-term selection work, aimed to obtain an early maturing beef strain of Ndama type cattle continues.

32. Progress on the Cattle Owner Settlement Scheme in Koinadugu District has been very satisfactory; details are given separately later in this report. By the end of the year some 59 settlements had been occupied; each settlement being approximately one square mile in area. The scheme aims at the settlement of semi nomadic cattle owners and thus to control overgazing, erosion and farm damage; it should in the long term also lead to increased local beef production.

33. *Pigs.*—Newton and Njala remain as the main breeding stations. There were unfortunately a considerable number of deaths at Newton from unknown causes; these are being investigated by the Veterinary Department. Some 121 pigs were sold for breeding and 108 for pork during the year. Pig keeping continued to be popular, particularly in the Colony area, and considerable supervisory and technical help was given to pig farmers.

34. *Rabbits.*—There was a very considerable demand for rabbits and 260 were sold during the year for breeding.

35. *Poultry.*—Regular imports of day-old Rhode Island Red and Light Sussex chicks from the United Kingdom are being continued to maintain the standards of departmental pure line stocks. Black and White Leghorns were also imported, and are proving to be better egg producers than the heavier breeds on the battery system. The sale of 6-8 week-old chicks to farmers has proved to be the most satisfactory system and it is

now standard practice. Egg production totalled 88,697 of which 4,465 were sold for hatching, 58,785 for table use and the remainder incubated; sales of chickens of all ages totalled 5,485 of which 4,031 were 6-8 week-old. Muscovy ducks again did well and 291 birds were sold, 205 for breeding and 86 for table use. Egg production totalled 3,711 of which 944 were sold for hatching. Because the fertility of the Chinese Geese remained poor and no answer could be found to this problem, it was reluctantly decided to reduce the stocks.

B—THE CULTIVATION OF CASH AND EXPORT CROPS

36. Appendix I sets out the comparative figures for agricultural exports and their value for recent years from the latest information available.

37. *Cacao*.—The export figures for 1956 and 1957, 2,881 and 2,011 tons, respectively, give the misleading impression that there has been a considerable decrease in production. This is not, in fact, the case because whilst the export figures cover the calendar year this finishes in the middle of the crop season. The actual tonnages purchased for the crop seasons 1956/57 and 1957/58, were 2,461 and 2,528 tons, respectively, which reflect more correctly the continuing upward trend in production. Interest in cacao remains keen and planting loans for some 420 acres were organised through the cacao Co-operative Societies in addition to private plantings; nevertheless there was still a greater interest in coffee production compared to cacao generally, because prices were more attractive and because there is comparatively less labour involved.

38. Departmental staff continue to advise farmers as to the correct fermentation technique, whilst further experiments are being carried out to determine whether an even simpler and equally effective method can be introduced. The quality for export remained good, a little over 93 per cent being Grade I.

39. Spraying trials against Black Pod Disease were repeated at Kpuabu and results indicate that 1 per cent Carbide Bordeaux mixture suppressed the disease and proved more effective than the proprietary compounds tested.

40. The development of the cacao/coffee station at Kpuabu was continued and seedlings of all the Amazonian varieties introduced from the West African Cocoa Research Institute have now been planted there for trial and multiplication.

41. The Produce Marketing Board continued to pay the same prices, according to grade, as in 1956, despite the low world price.

42. *Coffee*.—Exports again increased and this year were a record. New plantings continue to be established by farmers throughout the country but particularly in the South-western and South-eastern Provinces.

43. Despite advice to the contrary a lot of berries are harvested immature because the normal method is to strip the trees in one operation. Nonetheless, through the application of the new produce grading regulations, the final product on the whole was clean—a great advance on the position several years ago.

44. *Palm Kernels*. Exports fell again by another 5,000 tons on the 1956 figure. As indicated earlier this decline is largely due to the younger men, who harvest fruit, being absent in the diamond areas; additionally the wild oil palms are neglected and less interest is apparently being taken by the women, who usually collect a great number of fallen nuts for cracking; all in all probably because there is more cash about as a result of diamond mining, there has been less necessity for incomes having to be augmented in this way.

45. Propaganda aimed at encouraging planting using the ball of earth method is having effect and whilst fewer seedlings are being distributed there is a better percentage of survival. Early planting is also insisted upon. The use of wire collars to prevent attacks by rodents is also being encouraged with the assistance of the Produce Marketing Board.

46. *Palm Oil*.—For the same reasons as for those given regarding the decline in palm kernel production, palm oil has necessarily had to be imported to augment the smaller supply available locally.

47. *Ginger*.—A marked drop in price resulted in lowered production and exports. This crop is suffering from increased competition from Nigeria and India in particular.

48. The production of other minor crops, such as groundnuts and benniseed, again failed to reach exportable quantity, although larger supplies, particularly of the former, were grown for local consumption.

49. *Piassava*.—There was some decline in exports largely because of increased competition in the Sulima grade, particularly from Liberia.

50. *Calabar Beans*.—The demand for the "wild" crop is very inelastic; exports however fell slightly, presumably because of over supply in the previous year.

C—SOIL CONSERVATION

51. As indicated in previous reports Sierra Leone is fortunate in having no very serious soil erosion problems to deal with; nevertheless in any territory where the rainfall is high and shifting cultivation is the practice on the uplands, there can be no grounds for complacency.

52. Correct land use is without doubt the best general method of approach and the long-term policy of the Department is to encourage the movement of rice growing from the uplands to the more fertile swamps; this is being actively followed up both through schemes for rice growing on inland, riverain and mangrove swamps and by the encouragement of permanent plantation crop production on the undulating uplands.

53. The Department co-operates with the Forestry Department by encouraging and advising early burning of the grass, particularly in the northern Derived Guinea Savannah areas; this is enhancing natural regeneration.

54. The two departmental schemes directly concerned with soil conservation continue; that giving assistance to farmers in the erection of stone bench terraces in the Colony area has been very well supported and some fifty-one farmers have received aid to date. During this year terracing for the planting of economic tree crops was begun; previously this had only been undertaken for vegetable cultivation.

55. The second scheme, the Cattle Owner Settlement Scheme in Koinadugu District, is designed to restrict over-grazing and establish correct land use; by the end of the year some 63 areas, each of about one-square mile, had been demarcated and registered; of these 59 were occupied.

D—THE QUALITY OF AGRICULTURAL PRODUCE

56. In both the South-eastern and South-western Circles, staff continued to spend a good deal of their time advising farmers, either directly or through Co-operative Societies, regarding the best methods of preparing their cocoa and coffee. The fact that the 1957/58 cocoa crop was 93.1 per cent Grade I, 5.8 per cent Grade II and 1.1 per cent Grade III indicates how successful has been the campaign to improve the quality of cocoa production.

57. The establishment of Co-operative Societies has helped this improvement in the quality of the produce they handle, both because they set a high standard and because it is very much easier to disseminate this sort of propaganda through organised Societies. Each group consists of keen and interested farmers who are anxious to obtain the best possible price.

58. Work on all stations includes the testing and multiplying of new and better crop varieties for distribution to producers. In particular the quality of horticultural crops has improved in recent years, due to a wider use of the more suitable varieties of vegetable seeds imported and tested by the Department.

59. In general the quality of produce was good this year and farmers are becoming increasingly aware of the necessity for this improvement and of following the instructions of the Agricultural Department and the Produce Section of the Department of Commerce and Industry. Because of the fluctuations in world prices of primary products it is essential that only the best quality produce should be exported if Sierra Leone is to retain its place in this trade.

E—STAFF TRAINING AND AGRICULTURAL EDUCATION

60. The training of new Agricultural Instructors was continued at Njala Training College. Twelve students completed their course successfully during the year, seventeen were in their third year of training and nineteen of those recruited during the year successfully completed their first year practical course.

61. A short refresher course was held in August at Njala for Agricultural Instructors who have been in the field on extension and project work for some years.

62. Mr. W. C. O. Allen was released from secondment to Mabang Academy early in the year and returned to departmental duties.

63. Mr. A. R. Siafa, having completed his course at the Imperial College of Tropical Agriculture, Trinidad, returned and was appointed to the Department as an Agricultural Superintendent. Mr. H. O. Jarret continued his post-graduate work at London University; this has been extended to allow him to take a higher degree in Chemistry. Mr. S. A. Kawa, on the completion of his post-graduate year at Cambridge University, proceeded to the Imperial College of Tropical Agriculture, Trinidad, for his final year. Mr. S. A. Jabati completed his degree course at Reading University and moved on to Writtle Farm Institute to take the N.D. Agri. E. Course. Mr. M. B. Alpha is still completing his degree course at Reading.

64. Messrs. J. O. Palmer Davies and W. E. A. French successfully obtained their College Diplomas in Agriculture at Seale Hayne Agricultural College and returned to the Department as Agricultural Superintendents; Mr. N. A. Taylor started his last year's study at Seale Hayne. Messrs. E. K. Bendu and A. Koroma left for the United Kingdom and started their training at the Nottingham Farm Institute, and on a private farm near Birmingham, respectively.

65. Although many of those who are undergoing training are doing well, the handicap remains that most of them lack as good a grounding in science subjects as is desirable; this is a serious disadvantage both during their subsequent training and, initially, as regards the selection of potential candidates,

F—RESEARCH

66. The West African Rice Research Station publishes its report separately. The Director remained responsible, on behalf of the Sierra Leone Government, for the overall administration of this Station's work.

67. The Sierra Leone Sub-station of the West African Institute for Oil Palm Research (Benin) continued to be in the charge of Mr. E. B. May, Senior Scientific Officer. This station is sited near Departmental Headquarters at Njala and the closest co-operation is thereby maintained; their main experimental work is being conducted at Old Njala, the original site of the Department's Headquarters and experimental farm when it was established in 1911.

68. The work of the Departmental Research Staff is covered in Part II of this report. The Agricultural Chemist continued his investigations into the use of fertilisers, particularly for rice and groundnuts and on trace elements, as well as carrying out routine analyses of soils and feeding stuffs. The Plant Pathologist investigated banana diseases and continued his work on Black Pod Disease of Cocoa. The Soil Surveyor started a specific survey of the boli lands in the north.

69. Two important specialist posts remained unoccupied during the year, these of the Entomologist and Botanist Ecologist; the latter occasioned by the holder acting as Officer-in-Charge, West African Rice Research Station, Rokupr; as a result unfortunate delays into urgent investigations cannot be avoided.

G—GENERAL

70. Farming activities were again considerably affected by the diamond "rush" which has resulted in a decreasing production of many crops and increasing demands from consumers, who included many strangers; there was also a general increase in consumption levels with the rising standards of living. However the planting of coffee continues on a large scale and of cacao to a lesser degree. The demand for mechanical ploughing did not lessen.

71. District Councils in general were short of funds and this has led to the reduction or unfortunate closure of some schemes handed over to them a few years ago. In this connection the empoldering schemes in Kambia District, which were originally established at a considerable capital cost, have been seriously affected; proposals have therefore been made to the Central Government that such schemes should revert to the Department's control.

72. The technical staff positions, despite various changes, remains numerically, virtually as it was last year; however there are indications that it may improve considerably in 1958. Trained clerical staff continue to be well below requirements.

73. The Departments work was co-ordinated wherever possible with other departments, particularly the Co-operative, Produce and Veterinary, whose assistance is gratefully acknowledged.

74. On inter-territorial matters the Director attended the meeting of the Managing Committee of the West African Institute for Oil Palm Research at Benin in Nigeria in March and the second meeting of the West African Standing Advisory Committee for Agricultural Research in Accra, Ghana, in April; at the latter he was accompanied by the Officer-in-Charge,

West African Rice Research Station. The latter also visited Northern Nigeria and Ghana in an advisory capacity. Mr. Craufurd attended, as a United Kingdom delegate, the International Rice Commission of the F.A.O. in Italy; Dr. Hart and Mr. Piggott attended the West African Soil and Plant Nutrition Conference in Accra and Dr. Roberts visited the rice station at Kankan in French Guinea. Mr. Pyne, the Plant Pathologist, visited the West African Cocoa Research Institute in connection with the control of Black Pod disease of cocoa.

75. The Director ceased being an *ex-officio* member of the Legislative Council when the change in the Constitution was made. He remained a nominated member of the Produce Marketing Board.

76. All of the new Colonial Development and Welfare Schemes mentioned in the last report were started during 1957 and progress has been very satisfactory despite delays in the delivery of capital equipment. The main building programme was well ahead by the end of the year.

77. Two swarms of desert locusts invaded the northern part of the country during the dry season but returned to French Guinea without causing serious damage.

78. A second pamphlet in the new series for farmers was published, entitled "A Guide to Pig Rearing for Sierra Leone Farmers". Several further pamphlets were prepared and await publication.

J. W. D. GOODBAN,
Director of Agriculture.

31st August, 1958.

PART II—THE WORK OF THE DEPARTMENT OF AGRICULTURE

A—ORGANISATION AND STAFF

79. There was one major change in the organisation of the Department with the formation of a Water Development branch, which was established towards the end of the year when staff became available.

80. Mr. R. M. Steven, Principal Agricultural Officer, retired on pension in December after 29 years service in Nigeria and Sierra Leone. Amongst other losses Mr. H. J. Williams, Senior Agricultural Officer, transferred to the Northern Region, Nigeria in December; Mr. F. Tait, Agricultural Officer, transferred to Northern Rhodesia in December; Mr. J. P. Scott, Agricultural Officer resigned in October, and Mr. P. J. Rooksby, Temporary Agricultural Superintendent (Mechanical), resigned in December. Mr. S. G. Day, Agricultural Superintendent (Mechanical), was seconded to the Department of Commerce and Industry in October.

81. Mr. C. A. Tucker, Senior Agricultural Instructor, retired in November after 37 years service with the Department and was honoured with the award of the Imperial Service Medal.

82. Promotions included Mr. E. H. Nichols, Senior Agricultural Officer, to Principal Agricultural Officer in December; Mr. J. A. C. Davies, Agricultural Officer, to Senior Agricultural Officer in December and Mr. J. M. Oliphant, Temporary Agricultural Superintendent, to Agricultural Officer in May.

83. New appointments to the Water Development Branch were Mr. D. S. Garvie, Irrigation and Drainage Engineer and Mr. T. Maton Superintendent of Works, who were appointed in January and December respectively, on transfer from the Public Works Department.

84. Other new appointments included Mr. J. P. Law, Agricultural Officer who arrived in August; Mr. J. Chisnall, Soil Chemist (Surveyor) who was seconded from the pool of Soil Surveyors and arrived in May; Mr. A. R. Siafa, Agricultural Superintendent, who arrived in August and Mr. R. G. Routley, Temporary Agricultural Superintendent (Mechanical), who arrived in October.

Messrs. W. E. A. French and J. O. P. Davies having completed their departmental scholarship courses and obtained their College Diplomas at Seale Hayne Agricultural College, were promoted to be Agricultural Superintendents on their return in August.

85. Despite the new appointments a number of vacancies remained at the end of the year in all grades. The shortage of staff in the clerical grades in particular continued to seriously affect the work of the Department.

B—AGRICULTURAL STATIONS

86. The Department continued to operate its three main stations at Njala (Moyamba District), Newton (Colony), and Musaia (Koinadugu District). The task of generally supervising a number of District Council farms and nurseries scattered throughout the country continued to be a responsibility of the Department. The Director remained responsible for the general supervision of the work and activities of the Rice Research Station at Rokupr.

EXPERIMENTAL STATION. NJALA

87. *General.*—The work on groundnuts continued with fertilisers, time of planting and continuous cropping experiments. The yam variety trial and continuous cropping with yams and rice were also continued. The various leguminous cover crops were grown for a further year. One hundred thousand E.W.S. oil-palm seeds received from West African Institute for Oil Palm Research, Benin, were germinated and 5,388 seedlings were distributed from Njala during the planting season. At the end of the year a further batch of Amazonian cocoa arrived from West African Cocoa Research Institute, Ghana, and was planted in the nursery. 631 Amazonian cocoa seedlings, which were planted at Njala in December, 1955, were transferred and planted at the Coffee and Cocoa Development Station at Kpuabu near Kenema. The demand for coffee continued to be keen and over 32,000 seedlings were distributed in the North Moyamba District. In addition, 6,752 coffee seedlings were sent to the Agricultural Officer, Colony and 416 coconuts and 1,500 pineapple suckers were sold to farmers. Rooted cuttings of Pangola grass (*Digitaria decumbens*), were received from Jamaica and are being multiplied. This appears to do well at Njala.

88. *Livestock-Pigs.*—These continued to thrive and 257 were born during the year. The excess of revenue over recurrent expenditure in this section amounted to £720. Costing experiments were carried out and demonstrated that pig keeping was a profit making business, especially using local feeding stuffs. A working pig keeper can expect to make a net profit excluding capital expenditure of some £5 6s. 0d. per pig reared to 190–200 lb. live weight at approximately 20–22 weeks. Twenty-one pigs were sold for breeding and 56 sold for pork. Litter averages at birth were 8.9, and reared 6.6.

89. *Poultry*.—The section made good progress. At the end of the year the number of poultry had increased sufficiently to keep the electric incubator working to capacity. The average fertility of the eggs improved, the average for the year being 79.1 per cent. Hatchability also improved during the year, as a result of alterations which reduced temperature in the incubator room, the annual average was 65.1 per cent. Rearability average for the year was 81.4 per cent. This figure is considered to be satisfactory as it is calculated from the total number of chickens hatched, and hatching continued throughout the rains, when rearability shows a marked decline. 2,803 chicks were hatched and 1,437 were sold to local farmers at six weeks old. A total number of 1,768 chickens of all ages were sold to farmers. 10,611 eggs were laid of which 3,907 were sold for hatching or table use and the remainder incubated. Muscovy ducks hatched 122 during the year, 110 adults were sold for breeding and 38 for table use. The Chinese geese continued to show low fertility, and none were sold.

90. *Rabbits*.—These continued to do well and 54 were sold for breeding. New blood was introduced in the form of Flemish Giant, Giant Chinchilla and Belgian Hare bucks. The litter average at birth was 5.6.

91. Details of crop experiments and trials are rendered in Appendix III.

EXPERIMENTAL STATION NEWTON

92. *General*.—The station at Newton is representative of a large part of the Colony area, the soil of which is poor, sandy and generally over-worked; the chief vegetation consists of grass, low bush and oil palms. Poor farming has reduced yields to a minimum and therefore all developments are directed to increasing production by improved farming methods. On Newton farm this is being achieved by the use of rotations and intercropping, by mechanical cultivation and the application of compost, farm-yard manure and artificial fertilisers.

93. Intensive valley cultivation is also being demonstrated including the use of dams and gravity irrigation. Additionally stock farming has been designed to fit into the policy of soil conservation and maximum land use, and a model holding is operated to exemplify this on the small farmer's basis.

94. The station therefore also maintains cattle as muck makers; pigs, through a breeding unit, for sale to local producers, with a separate commercial unit to demonstrate the economics of this type of farming; poultry are kept similarly for sale to local breeders.

95. *Cattle*.—Eight of the nine cows calved and the herd increased to a total of 29. This herd of approximately 20 adult animals is adequate for the size of the station and, with the pigs, produces sufficient manure for farm use. The health of this herd was good throughout the year.

96. *Pigs*.—The health of the pig herd of Large Whites and Wessex Saddle backs continued to be unsatisfactory and many deaths occurred—a total of 82 in all from sucklings of a few days old to mature sows. The cause of the deaths is still a matter for speculation and no definite conclusions have been reached by the veterinary Department, other than the fact that Trypanosomiasis has been ruled out. Symptoms of virus pneumonia, food poisoning and African Swine fever have been observed in varying stages, but not in such a manner that a positive diagnosis could be made. The matter gives cause for considerable concern and is the subject of intensive investigation by the Veterinary Department.

97. Nevertheless the financial turnover in both breeding and commercial herds was higher than in previous years, totalling £2,333 for sales; one hundred pigs were sold for breeding, compared to 80 last year, and 52 for pork. Litter averages dropped, due to the disease factor mentioned above, to 8.0 (Large White) and 8.0 (Wessex Saddleback). The total stock at the end of the year numbered 158.

98. The commercial piggery was closed at the end of the year and incorporated into the main piggery. This project was started in 1955 to see if it was possible for one man with the necessary capital to make a reasonable income from a pig farm with an average breeding herd of nine sows. The initial costs were:—building £1,000, Stock £245, and implements £5 11s. 0d., a total of £1,250 11s. 0d. With the building and implements depreciated at 10 per cent of their initial value each year, profits were as follows:

Year	Net Profit			Labour rate		
	£	s.	d.	s.	d.	
1955	*416	6	0	.. 3	9	per day
1956	586	13	0	.. 4	9	„ „
1957	528	11	0	.. 5	6	„ „

* for 9 months of year only.

Only one man worked on this project and was paid at Government rates; a small holder, therefore using his own family labour could make a very good income running this type of project.

99. *Poultry*.—The chief breed is the Rhode Island Red which was first introduced in 1940. Light Sussex have proved popular and Black and White Leghorns have proved better egg producers than the heavier breeds. The system of rearing birds is well established and there were few problems, apart from the low egg production compared to United Kingdom standards, which has not been solved. Hatchability, which in 1956 was only 43 per cent, gave rise to concern as it continued at 45 per cent in the first half of the year. During the second half an overhaul of the incubators, rigid candling of the eggs, modifications to buildings and intensive training of staff showed spectacular results and raised the hatchability during the last quarter to 79.5 per cent. Rearability was very good and reached the record level of 86 per cent.

100. The health of the flock was good and no serious outbreak of disease occurred. A total of 3,717 birds were sold, consisting of 223 cockerels, 2,594 growers and 900 chicks. Total egg production increased to some 78,000 compared to 59,000 for the previous year, of which 4,133 were sold for hatching and 55,210 for table use.

101. Ducks continued to do well although some mortality with young ducklings occurred early in the year. As a result rearing them in the raised runs, as used for chickens, was tried and proved highly satisfactory. Trials on fattening ducks indicated that an outlay of 5s. 3d. each for food gave a drake averaging 6 lb. dressed at twelve weeks. Some 2,332 eggs and 95 birds for breeding, and 48 for table use were sold. The Chinese Geese, in spite of changes in management and feeding, continued to be poor egg layers with low fertility and, because additionally, local interest is not keen, the flock is being disposed of; 37 were sold.

102. *Rabbits*.—These did exceptionally well and 206 were sold for breeding. New blood was introduced in the form of Flemish Giant, Giant Chinchilla and Belgian Hare bucks.

103. *Model Holding*.—Details of this have been given in previous reports; the local farmer, who is getting old, was ill and will have to retire, and a replacement is therefore being found. The family consumed food crops selling off the surplus and realising a net profit of some £60. Most of this profit came from vegetables, fruit and seedlings and some reduction in stock. It is clear, as stated before, that such holdings can only pay their way if they can depend on family labour.

104. *Tree crops*.—The coconut and oil palm blocks are now well established. Applications of 1 oz. of Dieldrin to each coconut plant has solved the termite problem. Pawpaws, varieties Long Red, Madam Russel and Kaba'a, were planted on a large scale in the East Valley to provide fruit for the chickens. The mixed citrus and avocado blocks were maintained.

105. *Annual Crops*.—Chinese yam experiments again indicated that early planting, i.e. March/April, gave the highest yields. Other trials indicated that there was no significant difference between capping or not capping, nor in the difference between planting distances of 12 and 18 inches, but large sized sets gave higher yields than medium ones and medium higher than small. The yield of Chinese yams was lower than last year averaging 6,067 lb. acre against 11,408 lb. Pangola grass (*Digitaria decumbens*) was established and appears promising; it remained green during the dry season and covered the ground well. Rotational cropping continued on the degraded upland using yams, pigeon pea, cassava, Waterloo beans, *Stylosanthes gracilis* and *Pennisetum setosum*. The visual demonstration fertiliser plots on the upland continued. Observations over several years indicate that heavy dressings of compost or farm yard manure, or a grass fallow are the only methods so far tried which will maintain fertility and soil structure over a long period.

ANIMAL HUSBANDRY STATION, MUSAIA:

106. *Cattle*.—Policy continued to be directed along established lines. Investigations into breeding techniques confirmed the improved results from dry season breeding and it is proposed that this should become routine policy henceforward. Seventy-nine calves were born, compared to forty-six in 1956, and average birth weight rose from 33.8 lb. to 40.51 lb. A high standard of culling was maintained and this in part accounts for the improved birth weight figures. Health was moderately good throughout the year. Abscesses, however, caused a certain amount of trouble and the incidence of internal parasites, mostly Helminths, particularly in the young stock, gave rise for concern. Routine inoculations and prophylactic measures were undertaken against Black quarter, Anthrax, Rinderpest, Contagious Abortion and Worm infestation. Eighteen deaths occurred from various causes and five animals had to be destroyed.

107. *Sheep*.—Helminthiasis was troublesome and caused several deaths, including the two rams imported from Ghana. These deaths, and the rigorous culling of older beasts, reduced the flock by 17 head. 11 lambs were born and these, supplemented by purchases of selected animals from local sheep-herders, gave a nett increase to 42 head of sheep.

108. *Poultry*.—On the whole these did not do well. Worm infestation, coccidiosis and a form of paralysis among the adult birds similar to "slipped tendon", took their toll and caused considerable trouble. Rearability results were, therefore, disappointing; but attention to diet and management had a beneficial effect and the situation improved towards the end of the year.

109. *Maintenance*.—Fencing, which is in hand, presents the most immediate problem and it is imperative to extend this work if the breeding programmes are to be safeguarded and control of “parasitism” problems, by rotational grazing of pastures, is to be obtained.

110. *Pasture work*.—Observation trials on grasses were continued and two new introductions made, namely:—Pangola grass, (*Digitaria decumbens*); and Giant Star grass, (*Cynodon plectostachyum*). A grazing trial was laid down comprising half-acre plots of the following promising grasses; *Panicum maximum*—Dwarf Guinea grass; *Panicum maximum*—Strains C.P.I. 8357 and C.P.I. 8387; *Andropogon tectorum*; *Setaria kasungula*; *Pennisetum setosum* and *Brachiaria mutica*. Whilst it is too early to formulate definite conclusions there are indications the *Panicum maximum* C.P.I. 8387 and *Pennisetum setosum* give the highest returns in liveweight increase per cow-day/acre. Preparations for a trial to compare systems of pasture management related to tree cover and early and late, against no burning of grass were made.

111. *Crops*.—A comparative yield trial on rice varieties was carried out in conjunction with the West African Rice Research Station; pest damage is however likely to nullify the validity of the results. Other Rice yields, however, were more satisfactory and, where adequate after-cultivations were carried out, yields of over 1,500 lb./acre were recorded.

C—HORTICULTURAL SECTION

112. *General*.—As in past years the policy of providing technical assistance and advice to growers of fruit and vegetable crops continued. The necessity of improving both the quality and quantity of crops was emphasised in the extension work carried out and growers were encouraged to increase yields by the adoption of sound methods of cultivation and by the use of improved techniques and varieties of crops. Seeds, fertilisers and planting materials continued to be made available to the public.

113. During the year, it was possible, due to an improvement in the staff position, to establish an advisory office at Bo. This has long been an important requirement and has led to a considerable extension of horticultural activity in the area.

114. The introduction and testing of new varieties of vegetables and fruits continued and trials were carried out with new materials and methods which were likely to assist growers in improving yields. The use of proprietary brands of fertilisers, previously tested and found suitable, was recommended to progressive market gardeners as some of these products can now be obtained locally.

115. *New England Horticultural Station*.—This remained the headquarters of the section and was visited by large numbers of the general public. Additional terraces were constructed on the steeper slopes in the nursery section and further clearing was carried out to allow the establishment of permanent imported shrub and tree specimens. Another irrigation pump was installed, a new potting shed erected and the vegetable plant house extended. The old tools shed was demolished and a new permanent building erected.

116. *Lumley Horticultural Sub-station*.—The production of fruit trees, particularly budded citrus, continued to be the main function of the station. During the year terracing and the irrigation system were extended and new varieties of vegetables tested. The growing of rice in the Wet season continued and a considerable increase was made in the numbers of sour orange seedlings available for budding.

117. *Regent Nursery*.—Terracing was completed and the terraces planted with permanent fruit trees. The production of planting materials continued, as also trials with vegetable varieties, advisory visits to the mountain villages and the sale of seeds, fertilisers and insecticides.

118. *Kabala Horticultural Sub-station*.—The essential basic layout of the station, which has developed into the horticultural demonstration and advisory centre for the Northern Province, was virtually completed during the year. Several blocks of permanent tree crops were established to provide seeds, cuttings and budding material for propagation. A series of cover crops was established for soil conservation work. Vegetable varieties continued to be tested.

119. *Distribution of Planting Materials*.—The demand continued to increase and the following table gives comparative figures, excluding cuttings and seedlings not in baskets, since 1952.

			<i>Economic Plants</i>	<i>Ornamental Plants</i>
1952	..	..	796	460
1953	..	..	1,599	870
1954	..	..	3,898	1,970
1955	..	..	4,244	6,760
1956	..	..	3,547	6,916
1957	..	..	4,585	7,502

120. Distribution of vegetable seeds continued and some 11,280 packets were distributed during the year. Encouragement was given to market gardeners to establish themselves as seedsmen and several started this with success.

121. *Plant Introductions*.—Forty-four new introductions were made of which 23 were successfully established. Those successful included *Cupressus* spp., *Persea gratissima*, (Lula Pear), *Pinus Carribbea*, *Digitaria decumbens* (Pangola grass), *Cynodon plectestachum* (Giant Star grass) and *Achras Sapota* (Sapota).

122. *Experimental work*.—Trials on "Bacterial wilt" of tomatoes continued. Experiments carried out by the Plant Pathologist indicated that infection of plants by wilt was not necessarily dependent on the presence of eelworm in the soil; but that other soil micro-organisms were possibly involved in the spreading of the disease. The results of a trial with 'Vergerite' fertiliser and insecticide on shallots gave no significant results. The use of thick polythene sheet as protection to young lettuces during the heavy rain resulted in plants at least three times the weight at the same age as those unprotected. Preliminary work on budding citrus indicated that the use of grafting wax instead of raffia was not satisfactory. The use of plastic raffia was unsuccessful as moisture condensed between the layers of material and it became very hot, resulting in the death of the buds. Trials are being continued under shade, which has not so far been tested.

123. Trials with new vegetable varieties continued and of 55 tested, 17 were outstanding and 25 good. The outstanding varieties included lettuce "Imperial 847" and "Salad Bowl", okra "Perkins Mammoth", radish "All Season Long White", cabbage "Drum head", sweet pepper "Chili Red".

124. *Extension work.*—The posting of an Agricultural Instructor to Bo allowed a considerable increase in the spread of technical propaganda in the area. Agricultural Instructors continued to encourage school gardening and advise farmers on every aspect of horticultural work. Seeds, fertilisers and planting material were made available through the various offices.

125. *Terracing Scheme.*—For the third year this scheme proved very successful and popular, and a total of some 1,400 yards of terrace was constructed. To date some 51 farmers have received assistance and during the year 18 new farmers came into the scheme. During the latter part of the year emphasis was placed on terracing upland areas for the planting of economic trees or crops, whereas previously work had been solely for the extension of vegetable cultivation.

126. *Horticultural Show.*—The sixth Annual Horticultural Show was sponsored by the newly founded Sierra Leone Horticultural Society for the first time; it was opened by His Worship the Mayor of Freetown, Councillor L. V. Genet, O.B.E., and was well patronised, the total number of entries being 759 for the seven sections. Horticultural exhibits were also staged at the Kenema, Mattru, Moyamba and Kabala Agricultural Shows.

127. *Technical Propaganda.*—The series of pamphlets started several years ago, "Horticultural Notes" was extended and large numbers were distributed. Additions to these listed in paragraph 224 of the 1955 Report are as follows:—

- No. 14. Annual Flowers suitable for Sierra Leone.
- No. 15. Hints on the planting and after-care of fruit trees supplied by the Department of Agriculture.
- No. 16. Bacterial wilt of Tomatoes.
- No. 17. Popular Garden Plants and Shrubs.
- No. 18. The cultivation of Leeks, Artichokes and Watercress.

Demonstrations and lectures continued to be given to schools and organisations. A number of films on agricultural subjects were shown, with the co-operation of the Director of Information to gatherings of farmers and gardeners.

D—WATER CONTROL SECTION

128. The Water Control Branch of the Department was initiated after approval had been obtained for a Colonial Development and Welfare Scheme, D 3166, for the reclamation and development of 5,000 acres of swamp land for rice cultivation in the Great Scarcies area.

129. Mr. G. Lacey, C.I.E., Irrigation and Drainage Adviser to the Secretary of State for the Colonies had inspected and endorsed the scheme during his visit to Sierra Leone from 22nd January to 12th February, 1957.

130. An Irrigation and Drainage Engineer was appointed in January on transfer from the Public Works Department and took up his duties in August prior to going on leave. A Senior Superintendent of Works took up his appointment on transfer from the Public Works Department in December.

131. A temporary office was opened at Rokupr on 14th December pending the construction of the Water Control Branch base at Makot, near Mambolo.

132. Indents were prepared for machinery and plant which included five Dragline excavators, but no construction work was started as plant and staff were not available. Two excavator drivers were trained at Marampa by courtesy of the General Manager, Sierra Leone Development Company.

E—EXTENSION WORK

SOUTH-WESTERN CIRCLE (PUJEHUN—BO—MOYAMBA)

133. *General*.—Building construction work was undertaken at both Juring and Gbundapi. One Junior Service quarter, store and garages were completed at Gbundapi; the Senior Service rest house at Juring was extended but still requires minor works, and the Junior Service Quarters were built to the wall-plate level and will be finished in 1958. Transport difficulties and the long road haul complicated the building programme.

134. *Rice*.—A slight increase in the total acreage of inland swamp rice was noted; as far as production was concerned this increase tended to be nullified, however, by a generally poorer crop. The trend continues towards a decrease in upland rice farming but in view of the fact that 1957 was a good year for upland rice, overall production was higher than in previous years. The acreage of land cleared from mangrove remained steady, and very little interest was shown in expansion. Loans earlier issued under the mangrove clearance scheme continued to be collected.

135. *Mechanical Cultivation*.—There was a decrease in the acreage cultivated in some of the longer established areas especially Juring and Sulima, due to the non-payment of outstanding cultivation fees. This decrease, however, was more than offset by expansion elsewhere. The acreages cultivated annually over the last seven years are shown below:—

Site	1951	1952	1953	1954	1955	1956	1957
Gbundapi	32	403	321	256	303	559	522.5
Njeilonda	—	—	107	198	210.5	229	249.5
Panga Krim	—	—	—	24	17	22	—
Saama	—	—	170	130	—	—	—
Sulima	—	—	25	403	617.5	458	118.5
Bombohun	—	—	—	—	—	—	96.5
Malen	—	—	—	—	—	216	534.5
Gondama	—	—	—	—	—	—	84
Totals	32	403	623	1,011	1,148	1,484	1,605.5

The Co-operative Society tractors at Gbundapi were increased to four and where able to cultivate 604 acres. Ploughing, harrowing and sowing were carried out successfully and in time. In general, the crops obtained from mechanical sites have been satisfactory, although there are areas in the Malen sites where planting was carried out too late, resulting in flood damage.

136. *Cacao*.—Some 5,409 seedlings, local strains, were distributed from District Council nurseries in Bo and Moyamba Districts in addition to those produced by farmers for themselves. The Pujehun District Council reviewed its Revolving Loans Scheme but issued no further loans during the year.

137. *Amazonian Cacao Introductions*.—The plantation established at Futa is coming into bearing and pods were sent to Kpuabu sub-station for germination and raising of seedlings for distribution. Maintenance was generally good but a certain amount of thinning out of shade will be necessary in future.

138. *Coffee*.—Farmers continued to show marked interest in this crop, especially in Moyamba District. 5,619 seedlings were distributed from Bo District Council and 87,541 seedlings from Moyamba District Council nurseries. Farms, generally, are well laid out and maintained; there has been a steady and noticeable tendency for cultivation and marketing standards to improve.

139. *Piassava*.—Production remained steady with improvement in quality; advisory work continued.

140. *Oil Palms*.—The decreasing demand for seedlings, as recorded for 1956, continued in 1957 and only 20,051 were distributed. The decrease is due to lack of interest in this crop, in contrast to a greater preference for coffee establishment.

141. *Masanki Oil Palm Plantation*.—The replanting programme was continued for the Produce Marketing Board. Approximately 100 acres of previously felled land was planted up, fertilisers applied and seedlings ring weeded. Protection of seedlings by wire netting collars was instituted with promising results. A further 100 acres of old palm trees were line-felled in preparation for the 1958 planting programme and a new nursery was established, within the future planting area. At the end of the year 38,063 E.W.S. seedlings, ex West African Institute for Oil Palm Research, Njala, were established and are thriving. Some 19,964 seedlings remain in the old nursery, for planting out in 1958.

142. *Livestock*.—Considerable interest continues to be shown in the keeping of improved types of poultry distributed by the department. Demand again exceeded supply. There are two Council sponsored piggeries in Bo District, which are running very satisfactorily.

NORTH-WESTERN CIRCLE (PORT LOKO—SCARCIES)

143. *General*.—The establishment of the mechanical sub-station at Katonga on the Little Scarcies continued with the completion of a spare parts store and a double Junior Service quarter. An office was started but not completed by the end of the year. Extension work continued to be mainly concerned with rice production, but advisory duties and distribution of oil palm seedlings, economic plants and small stock also played an important part in the years work. Compilation of land use maps of the Kafu Bullom, Loko Massama and Mambolo Chiefdoms from aerial photographs continued and added to the data already compiled for the Great Scarcies area.

144. *Mechanical Cultivation*.—The area cultivated and planted in 1957 showed a satisfactory increase on the 1956 figures; 1,765 acres being ploughed and harrowed, and 579 acres being rotavated. Progress over the last six years has been as follows:—

1952	1953	1954	1955	1956	1957
645	683	757	1,001	2,008	2,334

In addition some 80 acres were combine drilled for farmers. Indo China rice both drilled and broadcast, did well in the Mankara—Kasanko area which are now been incorporated within the main scheme. The general growth, especially of the early sown rice, was good although there was a certain amount of flood damage amongst late sown broadcast rice. Damage tended to be confined to the varieties Lead and Pa Lath, both shorter duration rices. The problems of improving rice production in this area resolved themselves simply as follows:—(a) sun scorch damage

due to lack of adequate water early in the season must be avoided as far as possible; (b) the rice must be sufficiently well grown to withstand the rapid rise in water levels at the time of spring tides in September/October; and (c) the rice should not be planted too early or it will be submerged by flood waters at flowering time. These three problems can be resolved by the selection of a variety of suitable duration and by planting at the correct time.

145. *Development of Lophira Bush*.—The survival of oil palms planted at Malal in 1956 was very poor due to the ravages of "cutting grass" (*Thryonomous Swinderianus*) and the smothering effect of the annual grass *Pennisetum sub-angustum*. To ensure establishment only 240 oil palm seedlings were planted out, within individual wire collars, in a block of approximately 5 acres. Pigeon pea was interplanted as shade but nearly all the plants were destroyed by rodents. The oil palms grew reasonably well, but were exhibiting symptoms of magnesium deficiency later in the year. *Pennisetum sub-angustum* grew rapidly throughout the rains, and was cut in November and December to reduce the risk of fire.

146. *Oil Palms*.—Near Katonga, also on Lophira bush land, the small plantation established in 1954 progressed satisfactorily and fruiting started towards the end of the year. Distribution of oil palm seedlings from District Council nurseries to farmers continued to be hampered by inadequate transport facilities and only 7,835 seedlings were sent out. An improvement in survival rates of previously distributed seedlings was noted, at 68 per cent for 1957 as compared with 65 per cent for 1956.

147. *Piggery*.—Forty-four pigs were sold from the District Council piggery at Rosint, losses totalled 6, and head of stock increased to 54. With the present demand for pork this could well be a profitable venture, but unfortunately because of other factors this piggery is not as successful as it should be.

148. *Mangrove Clearance*.—Farmers obtained good yields from the 1956-57 harvest at Rowai. It was reported at the start of the year that farmers were becoming more interested in this area and the digging of "kiri kiri" began early. The area finally planted however was approximately the same as in 1956:

				1948-52	1953	1954	1955	1956	1957
Felled	..	..	..	91 acres	—	—	—	—	—
Cleared	..	..	..	79 acres	—	—	—	—	—
Planted	..	..	..	50 (1952)	46	31	30	42	42

The harvest for 1957-58 was reported to be good. Salt damage reduced the yield for the three farmers who attempted to cultivate land at Yeliba; where little active interest is shown. The unassisted mangrove clearing in the Gbabai Creek area continued to do well, where there are some 1,500 acres under cultivation. It is intended to map the area initially from aerial photographs during 1958 and then follow up with field survey and extension work to develop potential areas as yet not exploited.

149. *Saline Swamps*.—The drainage within the Bakepet polder remains unsatisfactory, due to lack of assistance from District Council funds for cleaning and general maintenance. About two-thirds of the area was cultivated in 1957 with very variable yields. There was a decrease in the area planted in the Mapotolon polder where some of the lower lying areas were

damaged by flooding, which was aggravated when the main bund was breached near one of the sluice gates. Although the farmers have co-operated in carrying out minor repair work, further work of a more technical nature is required to resolve the overall flooding problems within the poldered area.

SOUTH-EASTERN CIRCLE (KENEMA—KAILAHUN—KONO)

150. *General*.—Seven of the ten graded Agricultural Instructors were assigned to the three District Councils, and one assisted the Plant Pathologist with the Cacao Black Pod spraying trials. The duties of assigned staff were largely confined to general extension work on oil palm establishment, cacao and coffee preparation for the market and to the expansion of swamp rice cultivation. Supervision of the District Councils' oil palm nurseries and seed rice multiplication plots was also carried out.

151. *Rice*.—There was a slight increase in the area under both upland and swamp rice. The multiplication of pure-line seed rice, from the Rice Research Station, was carried out at Kenema, Segbwema, Manowa, Kailahun and Waiima. This seed rice is distributed subsequently to interested and progressive farmers. Simple demonstration plots showing the value of superphosphate fertilisers were also laid out. The sale of superphosphate, however, showed a marked decrease on previous years, largely because of transport difficulties.

152. *Cacao*.—There was a slight increase in acreage under this crop, mainly due to the Co-operative Department's Cocoa Loan Scheme. Departmental staff inspected and approved loans in respect of some 420 acres in connection with this scheme; loans averaging £6 per acre are being paid. The general crop position showed a slight improvement on 1956, production from the South-eastern Province for 1957 amounting to 2,327 tons. Fermenting trials and propaganda continued as in the previous years and a steady improvement in quality is noted.

153. *Cacao and Coffee Development Station, Kpuabu*.—The land for this station established under Colonial Development and Welfare Scheme D. 3055 was acquired at the beginning of the year. The area was surveyed and compensation was paid for all standing crops taken over. The existing crops were maintained and some *Gliricidia*, Bananas, and Coconuts were established. Amazonian cacao seedlings, propagated at Njala from selected strains obtained from West African Cocoa Research Institute, were planted out. This cacao looked very promising, established at 99 per cent and growth was satisfactory up to the onset of the dry season. Shortly after the onset of the dry weather, some 25 per cent of the trees were attacked by a stem borer (probably *Xyleborus morstatti* Hag). Some 10 seedlings died, and 30 seedlings were cut back; the remaining seedlings are recovering and the insect attack appears to have been checked by painting the stems and main branches with a solution of D.D.T. It is proposed to investigate the use of other insecticides, mainly B.H.C., in this problem. In addition one Junior Service quarter was constructed and work started on a Senior Service Rest House. A main access road was constructed and feeder roads started.

154. *Coffee*.—The acreage planted to this crop continues to increase. Due to adverse weather conditions, however, the 1957 crop was below average for the province. Propaganda was directed towards encouraging the farmers not to harvest green and upripe berries, which reduce the quality of the marketable product.

155. *Oil Palms*.—Seedlings distributed from District Council nurseries totalled 11,958, considerably less than previous years, but it is expected that with increased care and attention improving the survival rates the difference will, in fact, be more than offset.

156. Yield recording of the Angola oil palm plantation on the Kenema District Council farm continued. The yield for 1957 was 6,297 lb., a decrease on the two preceding years. This increase is thought to be due to potash deficiency and trials will be undertaken in 1958 to investigate this problem.

157. The District Council plantations at Senehun and Worodu now total 198 and 35 acres, respectively. Maintenance has been improved with resultant improved establishment. Some 22 acres were ploughed and 636 acres harrowed (this includes "double" harrowing).

SOUTHERN CIRCLE (BONTHE)

158. *Mangrove Swamp Reclamation*.—The loans scheme for mangrove swamp clearance was summarised in the 1956 Report. The few remaining debts, amounting to £227 7s. 0d., because of deaths or the farmers having left the district, will be written off. This clearance scheme, by means of loans, started in 1939. In 1952, when the District Council took over control of the scheme, it substituted a paid felling and clearing team for loan issues. Farmers pay an initial registration fee of 2s. 6d. and an annual rent of 7s. 6d. The progress of this scheme is shown in the table below.

Year					Felled	Cleared	Allocated
1952 ..	..	..	..	..	120 acres	nil	nil
1953 ..	..	..	..	..	280 acres	nil	nil
1954 ..	..	..	..	..	nil	135 acres	30 acres
1955 ..	..	..	..	..	nil	130 acres	38 acres
1956 ..	..	..	..	..	nil	40 acres	95 acres
1957 ..	..	..	..	..	nil	nil	129 acres

159. *Mangrove Survey*.—A detailed survey was not carried out this year but it was estimated that the acreage of cleared mangrove under rice cultivation amounted to approximately 1,500 acres. Several farmers felled mangrove to make minor extensions to their plots.

160. *Rice Variety Trials*—(a) *Shenge Island*—The observation trial on 9 new varieties from Rokupr was repeated at Shenge Island for a fourth year. H.M.C. 19, Elon Elon and C.24/102 have showed up best on average. Results are given below:—

Variety					Yields, paddy per acre in lb.				
					1954	1955	1956	1957	Average
C24/102	..	..	..	..	3,067	1,581	2,000	1,244	1,973
H.M.C. 19	..	..	..	..	2,960	563	2,628	1,126	1,814
Ebandioul	..	..	..	..	2,890	1,276	1,286	1,186	1,659
Siam 9	..	..	..	..	3,468	1,060	1,200	1,092	1,705
HR 1	..	..	..	..	1,183	2,250	1,746	1,076	1,564
Radin China	..	..	..	..	2,125	1,473	1,696	1,227	1,630
Reyon 6	..	..	..	..	1,930	1,024	1,666	1,214	1,458
Raminad	..	..	..	..	1,411	784	1,800	1,612	1,402
Elon Elon	..	..	..	..	1,814	2,721	3,000	813	2,087

(b) *Katin Island*.—A statistical trial to test four newly introduced varieties against two established varieties of rice was laid down on Katin Island. The two later varieties, Tisei and the popular locally selected variety Indo China 53, both did well. The four new introductions were not successful.

161. *Mechanical Cultivation*.—The scheme for the mechanical cultivation of the riverain grassland continued to have the support of over 1,500 enthusiastic farmers and 5,302 acres of ploughed and harrowed land were allocated to them by the Department in 1957. The progress of the scheme is shown in the following table:—

Year	1949	1950	1951	1952	1953	1954	1955	1956	1957	
Acreage	..	4	70	282	466	1,126	2,278	4,073	5,530	5,302

162. In 1957 three of the Sewa area sites, Yawbeko, Makita, and Torma I were handed to the Torma and Yawbeko Co-operative Societies and cultivated by them for their members. These sites total about 1,600 acres. Two new sites on the east bank of the Sewa river, namely Gbehan and Bo totalling 900 acres were opened in 1957. These and extensions to other sites were made to compensate for the sites handed over to Co-operative Societies. Thus the total acreage allocated to farmers in the District, including Co-operative Society sites, was 6,900 acres, an increase of 1,300 acres.

163. In spite of a poor start, due to infrequent rain in June and July, the rice crop recovered well. Rain continued until late in the year and the crop developed later than usual. The harvest was not completed until the end of February, 1958. Excellent yields were reported from all sites. At Diamani yields of paddy up to 2,240 lb. per acre were reported.

164. Work started in mid-January but progress in the Gbap—Messima area was slow mainly due to the tractors, old-type Fordson Majors, breaking down frequently. The prolonged dry weather, however, permitted a complete programme of ploughing, harrowing, allocating land and finally harrowing of seed for farmers who required this service to be carried out. One small site was cultivated by a Ferguson tractor on half-tracks. This machine proved its usefulness as an economical unit for working small irregular sites which are not liable to be flooded by light rain.

165. The landing craft was put into use in 1957 and quickly proved itself to be a most efficient means of transporting tractors, implements and fuel to the plough sites.

166. *Piassava*.—Specimens of *Nduvui* palm were sent to the United Kingdom for confirmation of botanical identification. The long-term rotational cutting experiment was continued into its sixth year. Results to date indicate that the palms should be cut every 2–3 years. More frequent cutting produces weak fibres and longer periods between cutting results in heavy, thick fibres with little springiness. A boiling trial which included treatments using caustic soda, was started during the year.

167. *District Council*.—As the Department resumed responsibility for ploughing fee collection the Agricultural Superintendent was de-assigned. One Agricultural Instructor was assigned to the Council throughout the year and he was responsible for supervision of the mangrove clearing team and the District Council oil palm plantation, and nursery, the distribution of oil palm seedlings and piassava advisory work.

NORTHERN CIRCLE (BOMBALI—TONKOLILI)

168. *General*.—Work within the Circle continued to be directed towards the application of advisory and extension services to farmers, with emphasis also on the development of mechanised rice cultivation on the boli lands. The agricultural activities of Bombali and Tonkolili District Councils, with which the Department is concerned in an advisory role and assigned departmental officers in a supervisory role, were again severely curtailed for financial reasons.

169. The department have now assumed complete responsibility for the Government leased area at Batkanu, from which the Forestry Department moved out during the year. At Makeni a double quarter was completed for technical staff and at Kontobe a Senior Service Rest-House, an Agricultural Instructor's double quarters, store and garaging were erected.

170. *Inland Swamp Development*.—Between 1947 and 1953 some 307 acres of swamp were cleared in 10 chiefdoms under Departmental and Native Administration schemes. Subsequently clearance was encouraged in both Districts by the District Council bonus schemes. Bonuses being assessed on a sliding scale of £2 £6 per acre. During the period 1954—1956 inclusive £1,684 11s. 0d. was paid under the scheme for 547 acres cleared, an average of £3 1s. 7d. per acre. The payment of bonuses was discontinued in 1957 by both Councils, but it is encouraging to report that farmers are continuing to clear and develop swamps themselves.

171. *Ox-Ploughing*.—The Mabole valley ox-ploughing scheme, previously handed over to the District Council, reverted to departmental supervision at the beginning of 1956. Spare parts were available from Bombali District Council and a firm in Freetown. One new plough was purchased from Freetown during the course of the year. The scheme continued to operate reasonably well and there are indications that ploughs that had fallen into disuse are being repaired. The interest of some of the farmers in trade and diamond mining has a detrimental effect on their farming operations.

172. *Mechanical Cultivation*.—Preliminary surveys have indicated that some 75,000 acres of Boliland are available for mechanical cultivation. Development is in two states; the first being the opening up of new sites by the Department and the second the handing over of established sites to rice producing co-operatives. Massimo sub-station and 1,300 acres of boli in the vicinity were handed over to the first of the rice producing societies at the end of 1956, and during 1957 they successfully cultivated the area with their own tractors.

173. During 1957 the Department successfully opened up new areas around Kontobe in Malal and Makari-Gbanti Chiefdoms. The new acreage was substantially the same as that handed over at Massimo. This was a creditable performance in view of the transfer of plant, the shortage of mechanical staff and the disappointing performance of some of the older tractors. Further detailed surveys were carried out, late in 1957, in Makari Gbanti and Libiesaygahun Chiefdoms along the axis of the new Batkanu—Fulatown road, whose long deferred completion by District Council has handicapped progress in this area. Considerable areas in the vicinity of this road await development.

174. A Soil Chemist arrived early in the year to carry out a soil survey of the bolilands. After a preliminary survey of bolis south of the Seli river and between the Seli and Mabole rivers, detailed survey work commenced in the Kontobe area late in the year. Details of his work are given later in this Report.

175. Arrears of ploughing fees still outstanding at Mateboi (Sanda-Tenraran Chiefdom) precluded the re-opening of this area. The Rothen area of Malal Chiefdom was abandoned, in 1957, for the same reason. The overall position regarding payment of fees remained unsatisfactory.

176. The development of Kontobe sub-station as a rice investigational centre proceeded and, concurrently with the building programme, a lease was taken of some 250 acres of boliland plus 12 acres of upland. Originally when a sub-station in this area was projected, it had been intended to site it on the more fertile riverain bolis adjacent to Mara, but owing to the non-completion by Tonkolili District Council of their section of the Mabole-Mara road, Kontobe had to be used as an alternative site. It appears that this boli is below average in soil fertility.

177. The preliminary conclusions to be drawn, for the soil conditions at Kontobe, from the 1957 investigational and experimental programme are as follows:—

- (a) Ploughing and Harrowing appear to be the optimum cultural operations;
- (b) Yields are negligible without Superphosphate and hardly in excess of 10 bushels with the addition of Superphosphate;
- (c) One cwt. of Superphosphate gives results equal to 2 cwts. of Superphosphate;
- (d) The addition of Sulphate of Ammonia does not affect yields;
- (e) Seed rates of $\frac{3}{4}$ bushel or above are necessary;
- (f) Drilling gives better results than broadcasting;
- (g) Medium short duration varieties, 200–220 days sowing to harvesting, appear to give better results than long or short duration varieties.

178. The following table of acreage ploughed shows the development of mechanical cultivation in this circle since its inception:

<i>District</i>	1952	1953	1954	1955	1956	1957
Bombali	238	607	1,600	1,373	192	640.5
Tonkolili	—	308	849	2,227.75	2,627.5	1,984.5
Total	238	915	2,449	3,600.75	2,819.5	2,625

Cultivation at Massimo and allied bolis was handed over to the Malenema Kuru Rice Producing Society, who cultivated approximately 1,300 acres. The total area under cultivation in the two Districts was therefore slightly in excess of 3,900 acres. New bolis were opened up around Kontobe sub-station, Tonkolili District and in Makari-Gbanti Chiefdom, Bombali District.

179. The sale of Superphosphate to boli farmers continued to be encouraging throughout 1957. A dressing of two cwt/acre is recommended, but the overall average dressing per acre actually applied only slightly exceeded 1 cwt. Differences and improvement in the rice crop where superphosphate had been used were most striking. The recommended time of application of superphosphate is when the seed is sown; most farmers nevertheless prefer and continue to use their fertiliser as a top dressing three to six weeks after sowing.

180. *Oil Palms and Coffee*—Distribution of seedlings of both crops was carried out, on a reduced scale, by the District Councils assisted by departmental staff. Increased attention is being paid to improvement of establishment/planting ratios hence the restriction in the numbers distributed.

NORTH EASTERN CIRCLE (KOIDADUGU).

181. *Cattle Owner Settlement Scheme*—The most important activity within this circle is the Cattle Owner Settlement Scheme, which was started in 1953 in co-operation with the Koinadugu District Council. Whilst the objectives of the scheme remain fundamentally the same as in previous years; namely to settle nomadic cattle owners and thereby control overstocking, erosion and farm damage, as well as also to encourage crop cultivation by the cattle owners; a new method of surveying areas has been adopted which entails using natural boundaries, as far as possible, to delineate settlements. The first step with the new method is to determine and demarcate the land needed around villages for cropping purposes. Subsequently settlements are established in the intervening land between villages.

182. Nineteen settlements were registered in Sulima Chiefdom and one in Musaia Chiefdom. One settlement, registered in 1956, was discarded. The total number of settlements now registered comprising 46 in Silima Chiefdom and 17 in Musaia Chiefdom, is 63. Some 57 Settlements are occupied and have valid tenancy agreements, 2 Settlements are occupied but the tenancy agreements await signature and the remaining 4 settlements are unoccupied at present.

183. The Tribal Authorities of Mongo and Sengbe Chiefdoms have each signed Tribal Orders similar to those obtaining in present settlement Chiefdoms within Yalunka territory. The two new Orders now make possible the extension of the settlement scheme into Kuranko territory for the first time. Steps are in hand to modify the Orders in vogue to include provision in future for "farming" areas, licensed grazing within farming areas, establishment of rent tribunals and stricter control of grazing techniques within cattle owner settlement areas.

184. Due to the "standstill" order under quarantine regulations for rinderpest, control of grazing in the newly created settlement areas has been difficult. These regulations have prevented the eviction of unauthorised cattle from settlements. Similarly for the same reason the limitations imposed on the cattle trade have restricted the purchasing powers of the Cattle Owners Association, who had intended to obtain supplies of Gamma-tox and sprayers. It is intended to pursue this proposal further as soon as opportunity permits. The Yalunkas view the scheme much more favourably than in previous years, now that they observe the general benefits that are accruing from the scheme and also as a result of the mechanical cultivation that can now be carried out, over 75 per cent of which has been for Yalunka farmers.

185. Five of the temporary bridges on the tractor road to Koba were washed away in the exceptional floods experienced during the year. These bridges have now been replaced by stronger structures. A branch from the Koba road also gives access to Selikon. This is essential for surveying and development of settlements within the later area. In addition an Instructor's office was added to the Gberia store; the tractor shed was extended and a new, open, implement shed was constructed to accommodate the increased amount of machinery now in use.

186. In Settlement No. 12 (Sulima) a dam and spillway was constructed almost entirely by Ferguson equipment. A concrete sluice was built, and an Electroflo water recorder was installed near the sluice to record rates of rise and fall in water levels. Records reveal that water levels fluctuate rapidly, rising to peaks of very short duration.

187. *District Council farm, Kabala*—This was maintained to the end of 1957: It is proposed that this farm reverts to the Department in 1958. Because of the shortage of Council funds, the Native Administration nurseries at Fadugu, Falaba, Bafodea, and Mongo Bendugu continued to distribute oil palm and coffee seedlings to farmers.

COLONY CIRCLE (NEWTON)

188. *Rice Swamp Development*—Rainfall distribution in 1957 was not favourable for the establishment of rice nurseries. It is all the more encouraging to note therefore, that in spite of the initial setback due to adverse weather, there was a further slight increase in the acreage cultivated at Maswari. There was likewise an improvement noted in requests received for mechanical cultivation of land. Crop yields were similar to 1956 averaging 1,450 lb./acre paddy and over; one yield of over 1,700 lb./acre was obtained; these plots being fertilised at the rate of 2 cwt. of superphosphate per acre. Unfertilised plots did not give such satisfactory yields, nevertheless an average of some 1,100 lb. acre of paddy was recorded.

189. No further work was done at Kotopema or Campbell Town due to inadequate labour being available and complete lack of interest on the part of such persons as remain and are available. A little more progress was made in mangrove clearing in the Songo Creek area. Failure of rice and poor yields in 1956 on the newly cleared areas have made farmers reluctant to plant up land until it has become sufficiently "weathered". An additional 8 acres were planted bringing the total for the area up to 28 acres cropped. Repayment of money due under the Rural Areas Mangrove Loans Scheme is proceeding satisfactorily.

190. Once again all the available land in the Wellington empolder was cultivated, and the crops were most satisfactory. This Scheme, which is now organised on a village committee basis, is an excellent example of progressive co-operation for the individual and common weal. The department assist and advise the Village Committee at all stages.

191. *Coffee*—There was a reduction in seedling distribution due to the fact that no funds were available, as in the past; from the Rural Areas Council. The nursery at Newton was continued on a smaller scale, financed by the department and some 9,500 seedlings were distributed.

192. *Waterloo Oil Palm Plantation*—A total of 802 acres have been planted since 1950, including 200 acres in 1957. Completion of the scheme to plant 1,000 acres should be attained in 1958. Establishment of seedlings was good; but, due to inadequate funds to buy sufficient wire netting collars, rodent damage occurred and a total of 200 replacements amongst earlier plantings was necessary.

193. Routine brushing of the area continued in 1957. The use of mechanical means of brushing was discontinued because of the number of breakages on the implement which was not designed for the job i.e. a Baronet Harrow. An area of five acres was stumped and cleared to ground level to determine the cost of this operation as a preliminary to complete mechanisation of the brushing operation. The cost was £10 per acre, (wages 5s. 6d. per day). Although initial cost appears high, i.e. £10,000 to complete the whole plantation, the saving in labour over the years will more than compensate for the high capital outlay.

194. Harvesting of the young palms, many of which were bearing for the first time in 1957, was continued. Bunch weights amounting to 35,135 lb. giving 22,984 lb. of fruit were recorded. Generally speaking the palms are extremely healthy although slight yellowing of the leaves was noted. A simple observation trial with fertilisers was carried out. It was noted that magnesium, either alone or in combination, showed a marked darkening of the foliage and increase in luxuriance of growth. It is quite apparent that there is a magnesium deficiency in the soils at Waterloo and such treatment is therefore now routine practice. Intercropping by local farmers was again encouraged. Such farming is extremely useful in the prevention of fire damage within the plantation. About 60 acres were interplanted in this way and also some 12 acres were cropped with cassava for livestock feeding on Newton farm.

195. *Oil Palm Distribution*—Some 6,018 seedlings were distributed to farmers and the policy of distribution only to those farmers whose land has been properly prepared was most rigorously enforced. In addition some 12,473 seedlings were used within the plantation.

196. *Local Stock Keeping*—Interest remains keen amongst Colony pig keepers and routine advisory visits were made throughout the year. Generally speaking, however, the condition of animals from local farmers was not so good as in previous years. This was due to the relatively high price of ready mixed feedings stuffs, which resulted in farmers increasing the cheaper, (rice bran), portion of the ration with adverse effects. Discussions with the Director of Commerce and Industry have helped to improve the position by a reduction in "mixed feed" prices and a stopping of sales of rice bran. It is very satisfactory to note that at the end of the year animals were benefitting from improved rations.

197. Poultry sales improved during the year and interest is developing in an encouraging manner. Farmers are beginning to realise the potential market for eggs and poultry in the Freetown area and many of them are making plans for large scale production. One farmer at Songo has imported 600 White Leghorn and Light Sussex crossbred birds for table use and egg production. It is pleasing to note that the design of the Dexion brooders in use at Newton has been copied by this same farmer.

F—RESEARCH

Plant Pathology Section

198. The Plant Pathologist was absent on leave from 7th to the 21st January, and paid a visit to the West African Cocoa Research Institute at Tafo, Ghana, from 5th to 18th July 1957.

199. *Collections*. Duplicates of mycological collections were sent to the Commonwealth Mycological Institute and Kew Herbarium. In the absence of a Systematic Botanist/Ecologist the phanerogamic herbarium was again supervised by the Plant Pathologist. Duplicates of collections were sent to Kew.

200. *Black Pod Disease of Cocoa*—The highest incidence recorded of “Black Pod” Disease, (*Phytophthora palmivora* Butler in farms in Nongowa, Gaura and Tunkia Chiefdoms was at Magbema (Gaura), where 20 per cent of the trees had an average of three diseased pods each.

201. Experimental work on this disease was continued at Kpuabu in Gaura Chiefdom during the season May–November. The trials were:—

- I. Control (untreated) v. S.V. and 1% Carbide Bordeaux applied at 1, 2, 3 and 4-weekly intervals.
- II. Control v. S.V. and 0.4% Perepod applied at 2 weekly intervals v. S.V. and 1% Carbide Bordeaux applied at 2 weekly intervals.
- III. Control v. S.V. and 0.4% Kopapod (Blitox Ipsilon) applied at 2-weekly intervals v. 1% Carbide Bordeaux applied at two weekly-intervals.
- IV. Control v. S.V.

N.B. S.V.—Sanitation and Ventilation i.e. brushing and removal of diseased pods.

Results indicated that 1 per cent Carbide Bordeaux mixture generally suppressed Black Pod disease in all treatments and was more effective than either Perepod or Kopapod. An estimate of the value of this spray indicates an appreciable profit per acre on plantations where this disease is serious. Results of the trials are given in Appendix III.

202. *Bananas*.—Leaf spot on bananas *Mycosphaerella musicola* Leach, (*Cercospora Musae* Zimm which was recorded for the first time near Njala in 1956 was recorded from Port Loko and Kambia Districts during the year where it was found to be more common on bananas growing on the uplands than on those on the swamps. In no case was the disease sufficiently severe to cause death and no appreciable loss in yield was noted. The leaf spot, *Scolecotrichum musae* Zimm, though of no economic importance was again recorded throughout Port Loko and Kambia Districts.

203. *Tomatoes*.—“Bacterial Wilt” disease of tomatoes was recorded at Kabala, Mandu, Njala and New England. An attempt was made to establish wilt symptoms under experimental conditions by (i) growing tomato seedlings in soil samples collected from the localities mentioned and (ii) inoculating seedlings with bacterial isolates from these soils. The heavy rains in September/October damaged the majority of these treated plants. In addition, 20 seedlings were transplanted to beds without treatment and by mid-October 14 seedlings had developed typical wilt symptoms. Diseased plants and soil samples were also examined for adult eelworms or their cysts but only in one collection of plants from Njala were active eelworms discovered, forming galls on roots. More often numerous hyphae on roots and evidence of bacterial activity in the vascular tissue were recorded.

204. *Rice*.—An outbreak of “False Smut”, *Ustilaginoida virens* (Cke) Tak. was reported in November to be fairly severe on rice varieties at Kontobe experimental site. Severe attacks by this disease are unusual. The varieties Radin Siak, Hadji Harun and Sughandi were most affected, Toma 112 and Pindosein slightly so and Parn, India Pa Lil and Nash not at all.

Systematic Botany Section

205. No Botanist was in post during the year and the Plant Pathologist continued to maintain general supervision of the herbarium. As stated previously a number of collections were sent to Kew.

Entomology Section.

206. The post of Entomologist remained vacant during the year.

207. *Coconut Beetle*.—The severe outbreak of Coconut beetle, *Oryctes owariensis*, and Red Palm Beetle, *Rynchophorus* sp., on coconuts in the Goderich area in 1956 was finally brought under control and there appears to be no other serious outbreak in the Colony area.

208. *Locusts*.—Two swarms of desert locusts invaded the northern part of the territory in February and March but returned to French Guinea after a short period. Little or no damage was done.

Agricultural Chemistry Section

209. The Agricultural Chemist was on duty throughout the year but spent a week in Ghana, at the end of March, attending the West African Soils and Plant Nutrition Conference.

210. *Soil Surveys*.—The sites for the proposed reclamation schemes by the Water Control Branch were examined. It was confirmed that the soils, if drained and water control initiated, could be expected to give high yields of rice. Surveys were also carried out of possible sites for the Cocoa and Coffee Development Station in the South-eastern Province. The site finally chosen had both topography and soil very similar to that used by local farmers; i.e. gently undulating ancient river terrace with lateritic soil, plus a wide belt of recent alluvium alongside a small stream.

211. A marked increase in the acreage under groundnuts in the Yonibana-Kumrabai Mamilla area prompted investigation into the soils; particularly in relation to the fertiliser experiments at Njala. It was determined that groundnuts were not grown on any particular soil type, but on selected land that had produced a good crop of upland rice in the previous year, usually areas which have had considerable growth of secondary forest. In this area secondary forest growth is adequate on soils which develop in situ, but is poor on the alluvial sands which occur on the Rokel River Series. These sands predominate near Yonibana; and, although having excellent physical properties for groundnut production, are of low fertility and are not utilised. Yields are only in the region of 400–600 lb. undecorticated fruit per acre and, as is shown later, nutrient deficiencies are serious. It is probable that considerable profits could be made by utilising fertilisers, especially Superphosphate and Magnesium Sulphate.

212. *Laboratory Investigations*.—Fewer routine analyses were carried out than in previous years owing to pre-occupation with field and pot experiments. Analyses were continued on local stock feeds. A brief genesis of Njala soils was undertaken and it was noted that the soil is being formed directly from the underlying rock, which is of granitic type. With increasing depth the Silica/sesquioxide ratio increases and below 12 feet the silica content approaches that of granite.

213. *Pot Experiments*.—The glass house mentioned in the 1956 Report was put into service in May. Using Webbs "Minus One" technique and tomato plants as the indicators, results showed that Njala farm soils were deficient in N, P, Ca, Mg, Mn, Cu and Zn; Waterloo Oil Palm Plantation deficiencies were top soil P and subsoil P, K, Ca, Mg, Mn, Cu, Zn and Mo; Newton farm Block B top soil and subsoil were deficient in N, P, K, Ca, Mg, Mn, Cu, Zn and Mo; and Kontobe Boli top soil deficient in N, P, Ca, Mg and Mn. A similar trial on Kontobe Boli soil, using Toma 112 rice as an indicator, showed that N, P, Mg, and Mn were deficient.

214. *Field Experiments with Groundnuts, Njala.*—In the 1956 experiment fertiliser responses were low, possible reasons being much earlier planting and the fact that the varying levels of the four fertilisers used had similar effects, there being no “control” for comparison. For the 1957 experiment the effects of three different planting dates were tried in conjunction with three different fertilisers, each at three levels. The results are given in Appendix III. This year there was no effect from sulphate of potash, probably connected with the fact that the land had received an overall dressing of this fertiliser in 1953. Planting date had a considerable effect on yield, but the differences were not statistically significant and there was no interaction between planting date and fertiliser response. Both dolomitic limestone and superphosphate improved yields considerably, there being no interaction between them.

215. In 1955 it was reported that the effect of superphosphate on groundnuts might be due to its calcium content and the 1957 experiment extended and confirmed this hypothesis. Up to a certain level the increases in yield from the various treatments were proportional to the calcium content of the fertilisers. Beyond this level increasing the calcium had little effect unless phosphate was present. The maximum yield was 1,420 lb. of undecoricated fruit and was obtained with approximately 4 cwts./acre superphosphate and 5 cwts./acre of limestone.

216. *Field Experiments with Swamp Rice, Kontobe.*—The experimental programme at Kontobe, a boli of low to average fertility, has been planned to solve agronomic problems involved in the mechanisation of rice production. The experiments are reported in this section as the Chemist was intimately concerned with the soils, fertilisers, layout and field work. Basic cultivations were disc ploughing and disc harrowing, the seed was combine drilled and harvesting was by means of a Massey Harris self-propelled 80 Special rice combine. There was no evidence of any previous cultivations on the land. Planting dates were late (early May) but, as the season was particularly dry, not late enough as reasonable germination did not occur until the last week of the month. Flooding was late but not abnormal in depth. There is a difference in level of about six inches from one end of the site to the other and some flood damage occurred in the lowest places.

Experiment A—Variety Trial.—Twelve varieties were laid out in a randomised block with four replications. As part of the West African Rice Research Station's field programme it will be fully reported separately in this Station's Annual Report.

Experiment B—Cultivation and Fertiliser Trial.—Although there was little expectation of any interaction between methods of cultivation and fertilisers, the fertiliser treatments were superimposed on the large plots needed for valid comparison of cultivations in order to save space. There were three cultivation treatments:—(a) Ploughing with disc plough and disc harrowing, (b) Polydiscing twice, (c) Rotavating; with four replications. The cultivation treatments showed little result except that rotavation was poorest, due to excessive weed growth; and ploughing plus harrowing better than either polydiscing or rotavating. The results of the fertiliser applications are given in Appendix III. Although Superphosphate doubled yield, as expected on these soils, 2 cwts. per acre was no better than 1 cwt.; sulphate of Ammonia gave no response. The Department has been recommending dressings of 2 cwts. per acre of superphosphate as desirable when the fertiliser is broadcast and this gives a reasonable margin of safety.

Experiment C—Annual Variations in Yield.—There are two cultivated plots each of two acres, one receiving no fertiliser and the other 2 cwt./acre Superphosphate. The cultivation, rice variety (Sughandi) and treatments will remain the same every year and this year the fertilised plot yielded 837 lb. paddy and the unfertilised only 94 lb. paddy per acre.

Experiment D—Effect of Seed Rate.—Results from a 3 x 3 Latin square gave mean yields of 639 lb., 819 lb. and 827 lb. paddy per acre for seed rates of 33, 48 and 55 lb. of paddy per acre respectively. It is clear when combine drilling that the seed rate should be over 48 lb. per acre.

Experiment E—Method of Planting.—This is a simple trial consisting of two large plots one of which was combine drilled and the other had seed and fertiliser broadcast. Running costs for drilling were 4s. 4d. per acre and the yield was 765 lb./acre whilst the cost of broadcasting was 6s. 10d. and the yield 670 lb./acre. It would appear that drilling is profitable where labour has to be employed and, incidentally, much quicker.

217. *Soil Survey Section.*—A Chemist (Soil Surveyor) arrived in May to start the survey of the northern flood plains or “boli” lands under Colonial Development and Welfare Scheme D. 3094. He was based at Batkanu during the year and was able to start work immediately as transport and equipment had been obtained prior to his arrival.

218. After a preliminary reconnaissance of the bolis under mechanical cultivation in the Kontobe, Lunsar road and Massimo areas he reported on the soils as follows:—

“The profiles examined showed a variable range of alluvial soils. The bolis appear to occur as alluvial, or in some cases possibly colluvial, deposits in valleys or depressions in the extensive lateritic gravel area. Bolis associated with the large rivers (e.g. Little Scarcies, Mabole and Seli) are the normal flood plain alluvial deposits, and a levee is frequently found between the river and the boli. Most other bolis have a small river or stream associated with them and this may dry up during the dry season. In these bolis the soil may be derived from alluvium brought down by the stream, alluvium brought up the stream by backing up from the large river during the height of the wet season, or from colluvium from the surrounding slopes, or a combination of any or all of these sources.

The depth of soil overlying the lateritic gravel in the bolis is very variable. Naturally the soil tends to be shallow at the edges of the bolis, but there are sometimes shallow areas (less than 12 inches of soil) which occur in other parts of the bolis.

Although the texture and appearance of the soil profile may vary considerably, the soils which have a depth greater than 18 inches usually have clay or clay loam, often with considerable silt to give silty clay loam or silty clay, in the lower part of the profile. The top is rather more variable, generally lighter in texture (may be partly due to the organic matter) and darker in colour for the same reason. The dry season causes a dehydration of the organic matter and hence the top soil is lighter in colour in the dry season than in the wet season. In the very shallow profiles there is little or no separation of the profile into horizons, the A1 horizon (or layer of

organic matter accumulation) extends down to the lateritic gravel. In many profiles there was a fine sand, and medium to coarse sand was found in one profile. In several areas the surface was a fine sandy loam, but the fine sand content decreased with depth to give clay loam or clay.

A common colour for the dry A1 horizon during the dry season is IOYR 4/1 on the Munsell Soil Color Charts. The profile gets lighter in colour with depth (i.e. an increase in value on the colour chart) and often moves over to the 2.5Y and 5Y charts, especially in the better drained soils. Mottling is not always present in the profile, but where it is, it is a distinctive feature. Mottling is more red than the basic colour in well-drained soils and blue to grey in less well drained soils. Red mottling of the 7.5R and IOR charts is sometimes found, often occurring in the soil surrounding lateritic pebbles. The general mottling is of a more reddish-orange to orange colour on the 2.5YR, 5YR and 7.5 YR charts."

219. During the wet season the aerial photographs were examined in detail and a map prepared showing the estimated extent of the boliland areas. The bolis can be grouped into the following areas:

(a) Around Batkanu. These are not extensive and are mainly adjacent to the Mabole River ...	14,000 acres
(b) Along the new road from Batkanu there are extensive bolis between Magbengba and the Lunsar road and they extend over to the Mabole river. These bolis are cut up by a large number of upland islands ...	26,500 acres
(c) A large area of boli associated with the Masene river extends for some distance to the north and south of the Lunsar road ...	22,000 acres
(d) Other bolis between the Lunsar road and the Seli river ...	8,000 acres
(e) The Kontobe group of bolis north of the Seli River ...	7,500 acres
(f) The Rochendonkon bolis and others south and west of the Seli river in that region ...	4,500 acres
(g) A large area incorporating the Mayoso, Mamunta and Magbas bolis ...	13,000 acres
(h) A large area between the Seli river in the north, and Kumrabai and Masang in the south	21,000 acres
(i) The Mabang and Masimo bolis ...	8,500 acres
Total ...	125,000 acres

Of this total 25,000 acres may be deducted for over-estimation on mapping and another 25,000 acres are probably unsuitable for mechanical cultivation. From the aerial photographs it appears that the area of boli land between Batkanu and the French Guinea border is much smaller than has previously been supposed.

220. *Geology of Areas Associated with Bolis*.—After discussions with members of the Geological Survey Department, the Soil Surveyor reports on the geology as follows:—

“The bolis are associated with the Rokel River Series, which is a marine formation consisting of muds and siltstones. The map in the Atlas of Sierra Leone shows the area of this deposit.

The formation of the Rokel River Series came about in the following way. There was an east-west compression of the granite which resulted in an undulating basin being formed. This basin became submerged below sea level and the basin filled in with fine marine sediments—mostly silts and clays. The area then became raised above sea level, but the basin still remained with granite on the east and west sides and also some schists on the west side.

Weathering of these soft sediments was much quicker than that of the granite and the surface of the Rokel River Series is now below that of the granite in the east and west. The weathering has resulted in the formation of the familiar lateritic gravel. Weathering has reached a depth of 30 feet or more on the west side and slightly more on the east side.

There have been a number of drainage patterns at various stages of weathering and this has resulted in river capture, terraces and old river beds being left unassociated with any present day rivers. It is with these various drainage patterns that the bolis are associated. Faults and dolerite sills have determined the courses of the rivers in some places.”

G—NJALA TRAINING COLLEGE

221. *Agricultural Courses*.—The system of students undergoing one year of pre-entry field training under the supervision of Agricultural Officers continued. There was no recruitment for the first year's field training in 1956 so no new entry to the College took place in 1957. Twenty-six students were recruited and completed their first year's field training in 1957 and of these nineteen were accepted and will be entering the College in 1958.

222. The seventeen students in their third year, which include two students being trained on behalf of the West African Institute for Oil Palm Research and two from the Gambia, successfully completed their year's study. Of the sixteen students in their fourth and final year, one was dismissed during the year and three failed their final examination. The twelve remaining will be posted to Agricultural Stations early in 1958.

223. The course syllabus remained unaltered with the usual interchange of Education and Agricultural Staff. Emphasis continued to be placed on practical subjects required by the Department of Agriculture in the field. The number of English and Arithmetic lectures was increased in view of the necessity for students to now take the Civil Service Entrance Examination. The final year students as usual submitted dissertations on special subjects requiring extensive reading.

224. Practical work continued on the College Farm on established lines. Contour strip cropping continued and the citrus strip was extended. The collection of economic and ornamental trees continued to be enlarged.

225. The livestock section is a special feature with pigs as the main enterprise. A hog has supplied monthly to the students mess. The rabbitry was extended and two bucks imported by the Department from the United Kingdom were obtained to give new blood. A small laying flock of Light Sussex fowls was kept under a semi-intensive system and a small number of cattle were kept. These activities, which are run by the students, give them excellent first-hand knowledge of practical livestock work.

226. Further visual aid material, including film strips, was collected from manufacturers of farm equipment and other sources. Old departmental engines and machinery were sent to the College and the students dismantled these during practical periods to obtain a better understanding of their working.

227. The final year students visited Kenema District to study Cacao and Coffee and to see the various Agricultural and Forestry activities.

APPENDIX I—EXPORTS OF PRINCIPAL AGRICULTURAL PRODUCTS

Commodity	1938			1954			1955			1956			1957		
	Ton	Value	(ton)	Ton	Value	(ton)	Ton	Value	(ton)	Ton	Value	(ton)	Ton	Value	(ton)
	£	£	£	£	£	£	£	£	£	£	£	£	£	£	£
Bananas ..	1	2	—	682	16,169	24	292	7,624	26	16	333	21	17	407	24
Beeswax ..	—	—	—	20	8,392	420	19	8,889	468	11	6,074	528	2 $\frac{1}{2}$	1,236	494
Benniseed ..	374	3,700	10	198	17,561	89	111	8,848	79	12	761	63	—	20	—
Calabar Beans ..	—	—	—	—	—	—	47	9,143	194	125	31,797	254	90	22,095	246
Cocoa ..	384	5,849	15	1,738	802,565	462	2,177	740,829	340	2,881	581,305	201	2,011	385,946	192
Coconuts (fresh) ..	n.a.	44	—	104	2,445	23	25	680	27	24	1,013	42	19	392	21
Coffee ..	38	793	21	2,393	862,892	373	2,092	473,983	226	3,009	660,875	219	3,758	895,672	238
Ginger ..	2,705	60,680	22	1,143	162,206	141	1,733	357,320	206	1,117	241,269	216	700	99,880	143
Groundnuts ..	n.a.	5	—	1,142	64,288	56	—	2	—	—	2	—	—	2	—
Kola nuts ..	1,450	29,785	20	1,379	275,545	200	1,127	212,095	188	828	106,840	129	736	102,942	140
Palm Kernels ..	63,697	457,031	7	68,080	3,763,924	55	57,640	2,509,537	43	57,645	2,507,839	43	52,967	2,253,357	43
Palm Oil ..	1,006	16,025	15	919	53,667	58	15	2,252	150	13	1,464	113	11	1,233	112
Pepper (dried) (Red) ..	90	3,410	38	4	941	235	14	2,653	190	2	324	160	77	1 $\frac{1}{2}$	217
Pepper (dried) (Black) ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Pepper (dried) (White) ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Piassava (Prime Sherbro) ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Piassava (Sulima) ..	3,751	40,369	10	5,693	334,210	59	4,344	215,179	49	4,633	262,111	56	3,641	199,982	55
Total Value all main Agricultural Exports	—	617,693	—	—	6,364,805	—	—	4,588,223	—	—	4,449,341	—	—	4,011,335	—
Total Tonnage all main Agricultural Exports	73,556	—	—	83,475	—	—	70,218	—	—	70,927	—	—	64,662	—	—

APPENDIX II—RAINFALL

Station	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Average
Musaia	..	..	..	1.72	4.90	10.43	10.70	13.63	14.36	20.58	4.17	Nil	80.91	80.83
Makeni	..	..	0.42	4.80	3.05	18.06	25.96	16.80	27.08	14.73	6.15	0.14	116.97	119.60
Kontobi	..	..	Nil	3.20	4.18	19.82	19.84	21.94	26.04	16.53	6.23	2.67	120.45	—
Katonga	..	..	0.06	0.44	1.95	12.66	24.50	14.73	17.64	18.53	4.68	1.09	96.28	—
Batkanu	..	..	0.57	1.04	5.35	11.91	16.32	12.86	19.84	17.49	9.56	1.14	96.08	107.50
Port Loko	..	..	0.06	0.44	1.95	N.R.	24.59	14.73	17.64	18.53	4.68	1.09	87.71	128.40
Rokupr	..	..	Nil	2.58	1.54	11.78	34.65	13.24	20.40	13.21	3.22	0.78	101.40	117.15
Lungi	..	Trace	Trace	1.43	6.75	15.37	39.30	27.22	21.77	12.32	5.25	1.06	130.48	134.12
Newton	..	..	0.85	1.27	7.61	12.60	33.53	20.98	27.73	13.75	5.88	1.54	125.74	118.30
Waterloo	..	..	Nil	0.36	1.93	5.13	10.07	19.58	22.63	11.75	8.91	Nil	80.36	—
Hill Station	..	..	Nil	0.67	11.14	14.72	71.84	41.08	31.15	24.94	7.36	1.26	204.16	172.09
Lumley	..	..	Nil	0.94	8.08	35.99	70.37	51.33	24.70	26.57	5.89	0.42	224.29	—
Njala	..	..	1.75	3.64	4.72	12.16	13.22	17.96	24.51	27.65	7.04	1.18	113.99	98.46
Bo	..	Trace	5.15	3.72	8.58	10.76	18.08	19.82	21.19	25.11	8.92	1.89	124.19	115.47
Bonthe	..	Trace	2.55	2.16	6.14	25.50	29.49	20.29	20.15	21.22	6.88	2.70	137.18	155.57
Solon	..	..	2.05	1.64	3.65	24.54	28.19	16.14	23.01	15.04	4.33	0.45	119.04	—
Torma	..	..	N.R.	3.61	10.93	22.95	34.72	11.42	23.27	14.50	10.56	2.46	134.42	—
Kenema Farm	..	..	1.14	3.30	8.70	8.93	16.81	14.40	19.23	16.38	8.71	2.64	101.05	114.06
Kailahun	..	..	1.85	9.05	7.03	19.20	15.79	17.65	14.85	19.00	5.10	1.15	110.67	109.94
Yengema	..	..	1.76	6.42	12.36	7.98	11.18	12.79	25.85	13.68	9.22	1.43	104.95	96.69

N.R.—No Record available.

APPENDIX III

RESULTS OF TRIALS AND EXPERIMENTS, NJALA

I. *Leguminous Fodders and Green Manures*.—*Stylosanthes gracilis* planting was extended during the year. Establishment, with the first rains, under Pigeon pea (*Cajanus*) was most effective; it would appear that earliness and establishment under light shade give best results. Poultry receive fresh *Stylosanthes* daily and it is also fed after cutting, drying and hammer milling throughout the dry season.

The Analysis of *Stylosanthes gracilis* was as follows:—

<i>Treatment</i>	per cent <i>Moisture</i>	per cent <i>Fat</i>	per cent <i>Ash</i>	per cent <i>Protein</i>	per cent <i>C. Fibre</i>	per cent <i>No. free extract</i>
Milled—fresh ..	11.0	2.0	7.6	12.0	31.4	36.0
Milled—dried for 4 days ..	10.5	2.0	8.4	15.3	29.7	34.1
Milled—dried for 7 days ..	8.9	2.0	14.0	17.3	21.5	36.3

II. *Groundnuts (a)—Time of Planting/Fertiliser Trial*—The object of the experiment was to determine the optimum dressings of Dolomitic Limestone, Superphosphate and Sulphate of Potash over various Planting dates. The local Kono variety of groundnut was used throughout. Three replications of each factor were used.

(i) *Effect of Planting dates*

Yield in lb./acre (undecorticated)

<i>Planting Date</i>	<i>Average yield</i>	<i>Plots with Superphosphate</i>
18/4	980 lb.	1,324 lb.
2/5	1,240 lb.	981 lb.
20/5	1,155 lb.	622 lb.

(ii) *Effect of Fertilisers on the Yield of Groundnuts*

Yields in lb./acre (undecorticated)

DOLOMITIC LIMESTONE							
<i>Superphosphate</i>				0 lb/ acre	540 lb/ acre	1080 lb/ acre	<i>Average</i>
0 lb. ..	..	..	..	577	1,118	1,101	932
202 lb./acre ..	..	..	..	910	1,325	1,358	1,199
404 lb./acre ..	..	..	..	1,011	1,420	1,326	1,252
Average ..	..	..	..	834	1,288	1,261	1,127

(iii) *Mean Effects of Sulphate of Potash:*

<i>Weight of Fertiliser</i>				<i>Yield</i>
0 lb. ..	..	..	..	1,137 lb.
202 lb./acre ..	..	..	..	1,140 lb.
404 lb./acre ..	..	..	..	1,118 lb.

(b) A groundnut crop has been taken each year on block 15 since 1951, without the application of fertiliser, to study the effects of continuous cropping. This year half the block received a dressing of fertiliser and the yield exceeded that of 1951 though the yield of the unfertilised block was above that of previous years. The fertilisers applied to the half acre block were at the following rates:—

Dolomitic limestone	..	..	20 cwts. per acre
Superphosphate	..	..	2 cwts. „ „
Potassium sulphate	..	..	2 cwts. „ „
<i>Year</i>			<i>Yield undecorticated fruit (lb./acre)</i>
1951	..	..	974
1952	..	..	512
1953	..	..	711
1954	..	..	358
1955	..	..	289
1956	..	..	140
1957	..	..	1,700 (fertilised) 363 (unfertilised)

III. *Yams*.—The variety trial which started in 1954 continued. Good yields were obtained this year, due to the use of newly cleared land, but germination was poor.

	1954	1955	1956	1957
Yellow Yams	.. 2,259	10,224	7,267	12,442
White Yams	.. 1,452	971	2,827	1,803
Water Yams	.. Not grown		7,350	11,613
Chinese Yams	.. do.		not grown	9,880

(Yields in lb. per acre)

IV. *Continuous Cultivation of Annual Crops*.—The method of mixed cropping introduced in 1952 continued. In this system the crops are rotated in space rather than time. After deep cultivation, ridges four feet apart are planted with yams and placed fertiliser. Later rice is sown in the furrows. Ridges are split each year so that any residual manures are thoroughly mixed with the soil.

1959: The block was ploughed and ridged by Ferguson tractor on 25th February, 1957. Yams and cassava were planted one week later and the rice was planted on 24th May, 1957, Superphosphate was applied at the rate of 4 lb. 200 lb. per acre applied in the furrow. Yields were well below previous years and in terms of calorific value the number of men who could theoretically be fed from the one acre declined to one. The early planting and the late onset of the rains partly accounted for the large reduction in yield.

Year			<i>Husk rice (lb.)</i>	<i>Cassava (lb.)</i>	<i>Yams (lb.)</i>	<i>Musaia Cowpea (lb.)</i>	<i>Men fed per year per acre</i>
1952	..	..	.. 135 (Flagoi)	7,553	1,238	10	4.50
1953	..	..	.. 120 (Flagoi)	5,033	3,346	—	3.96
1954	..	..	.. 497 (Glaberrima)	3,235	1,306	56	2.75
1955	..	..	.. 483 „	2,826	81	6	2.77
1956	..	..	.. 2.6 „	3,137	1,252	—	2.58
1957	..	..	.. 136 „	1,438	844	—	1.00

V. *Permanent Crops*.—Yield recording of Citrus, Coffee and pineapples continued.

Coffee.—The records of *Robusta* coffee yields at Njala for the period 1936—1957 are summarised below, both blocks are 1 acre and were planted in 1934; these yields are of particular interest, as it is clear that even on poorer soils with rather excessive shading they can be quite reasonable.

Year	Yield in lb. per acre fresh cherries		Remarks
	Block 17	Block 25	
1936-1939	..	..	No Records
1940	..	..	89 78
1941	..	..	126 94
1942	..	..	337 130
1943	..	..	758 338
1944	..	..	357 249
1945	..	..	515 526
1946	..	..	502 606
1947	..	..	1,067 894
1948	..	..	1,141 1,050
1949	..	..	503 120 Both blocks pruned to
1950	..	..	436 1,725 three stems per plant
1951	..	..	583 1,499 in 1949.
1952	..	..	592 1,495
1953	..	..	152 1,859
1954	..	..	153 43 Block 25 cut to 1 foot
1955	..	..	1,138 331 in 1954 & allowed to
1956	..	..	1,319 568 regenerate to 3 stems
1957	..	..	1,098 224 per stand.
Average 18 years	..	..	604 657

The coffee on Block 17 was dug out and replanted in the 1958 planting season. The following are recorded yields for *Stenophylla* Coffee planted in 1934, based on a block of 0.43 acres and *Excelsa* Coffee also planted in 1934 and based on a block of 0.52 acres, in lb. fresh cherries per acre.

Year	1950	1951	1952	1953	1954	1955	1956	1957
<i>Stenophylla</i>	.. 24	61	178	NIL	63	327	228	NIL
<i>Excelsa</i>	.. 1,182	2,068	1,145	N.R.	1,874	N.R.	993	2,975

Grapefruit.—Two Marsh Grapefruit clones were planted in 1949 having been selected and budded from the two highest yielding trees originally in the same blocks; these blocks having been cut out in 1949 due to citrus scab disease whose origin was budwood from the original trees imported in 1916 from Florida, United States of America. Yields have been as follows from the 1 acre blocks each of 52 trees:—

		Yields in number of fruit per acre						
Year		1951	1952	1953	1954	1955	1956	1957
Marsh Clone I Block 7	..	3,136	1,515	1,643	6,520	3,465	14,612	5,306
Marsh Clone II Block 11		511	443	1,481	7,640	4,352	11,979	5,724

APPENDIX—III—(contd.)—RESULTS OF SPRAYING AND VENTILATION AND SANITATION TRIALS FOR THE SEASON
MID-MAY EARLY NOVEMBER, 1957 AT KPUABU

	TRIAL I: <i>Pods were sprayed with 1.0% Carbide Bordeaux at intervals of 1, 2, 3, & 4 weeks</i>					TRIAL II: <i>0.4% pere pod was compared with 1.0% Carbide Bordeaux; pods were sprayed fortnightly</i>			TRIAL III: <i>0.4% Kopapod (Blitox Ipsilon) compared with 1.0% Carbide Bordeaux; pods were sprayed fortnightly</i>		TRIAL IV: <i>Ventilation (includes Sanitation & Removal of Diseased pods)</i>		
	Control	1	2	3	4 weeks	Control Untreated	Pere-pod	C/Bordeaux	Control (Untreated)	Kopapod	C/Bordeaux	Control Untreated	Ventilation
(i) Total Black pods per season(%)	54.19	0.18	0.84	0.34	nil	41.17	1.52	0.93	28.57	3.41	0.52	42.68	26.93
(ii) Total Ripe pods per season(%)	45.8	99.82	99.16	99.65	100	58.83	98.48	99.06	71.48	96.59	99.48	57.32	73.07
(iii) Total pods (actual Black Ripe Pods)	801	553	353	576	564	855	987	1,384	730	708	1,696	1,244	776

N.B.—(a) Black and Ripe pods (i) and (ii) are expressed separately as percentages of Total Pods (iii).

(b) PLOTS: Each plot contained 6 trees producing a minimum of 12 pods per tree.

(c) REPLICATIONS: There were 6 replications of each treatment (i.e. total of 36 trees allocated to each treatment or 144 trees to Trial I; 108 trees to Trial II; 108 trees to Trial III, and 72 trees to Trial IV).

APPENDIX IV

SIERRA LEONE WEIGHTS AND MEASURES

The sale of local produce in native markets is almost invariably done by volume. Standard containers which can be readily obtained are used, the commonest being the cigarette tin (cup) and the beer bottle. Larger measures are the four-gallon kerosene tin, and the kerosene case, which held two tins. These are no longer readily available since fuel is now principally supplied in 44-gallon drums or in bulk.

Certain measures became standardised by usage for the major agricultural commodities. The average weight of a kerosene case, heaped up until no more stayed on, was taken as the basis for the "bushel" weight. The Sierra Leone "bushel" is, therefore, considerably greater than the Imperial bushel. It does not even refer strictly to the older "Colonial" bushel used up to 1900, but to the weights of the lots in which commodities are traditionally traded.

The following tables contain most of the Sierra Leone measures.

Basic Measures of Volume.

4 cigarette cups	..	..	..	1 penny pan
2 penny pans	..	..	..	1 threepence pan
5 threepence pans	..	..	..	1 kettle (21 lb. clean rice)
2 kettles	..	..	..	1 can or tin
2 cans or tins	..	..	..	1 "bushel" (84 lb. clean rice)

Standard nett weights per bag.

Cocoa	..	..	..	140 lb.
Coffee	..	..	..	132 lb.
Ginger	..	..	..	212-235 lb.
Groundnuts (undecorticated)	..	..	..	77 lb.
Palm Kernels	..	..	..	182½ lb.
Rice (clean)	..	..	..	168 lb.
Rice (paddy)	..	..	..	120 lb. (often 150 lb.)

*"Bushel" weights.**"Bushel"*

Benniseed	..	..	..	60 lb.
Chillies (dried peppers)	..	..	..	28 lb.
Groundnuts (unshelled)	..	..	..	36 lb.
Guinea corn	..	..	..	84 lb.
Kola nuts ("measure"—8 kettles)	..	..	..	176 lb.
Maize	..	..	..	72 lb.
Palm kernels	..	..	..	60 lb.
Rice (clean)	..	..	..	84 lb.
Rice (paddy)	..	..	..	60 lb.

Miscellaneous Measures:

"bundle" of piassava	..	..	..	56 lb.
bottle—reputed quart	..	..	..	¾th gallon
bottle—reputed pint	..	..	..	½th gallon
Cigarette cup	..	..	..	8 to 9½ oz. of rice
kettle (clean rice)	..	..	..	21 lb. (2 gallons approx.).
tin(or can):—	..	..	..	4 gallons
of honey	..	..	..	48 lb.
of palm oil	..	..	..	38 lb.

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*To be purchased from the Government Bookshop, Water Street, Freetown and
from the Crown Agents for Oversea Governments and Administrations,
4 Millbank, Westminster, London, S.W. 1.*

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